



- 1.5712(74.7)<sub>6</sub>  
81

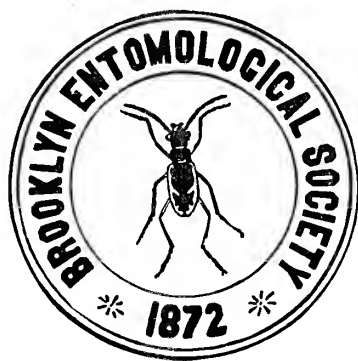
Digitized by the Internet Archive  
in 2017 with funding from  
IMLS LG-70-15-0138-15



BULLETIN  
OF THE  
BROOKLYN ENTOMOLOGICAL  
SOCIETY

Vol. XLV

1950



EDITED BY  
GEORGE S. TULLOCH

PUBLICATION COMMITTEE  
JOSEPH C. BEQUAERT  
GEORGE S. TULLOCH EDWIN W. TEALE

6841

JUL 1 1954

# BULLETIN

OF THE

## BROOKLYN ENTOMOLOGICAL SOCIETY

---

VOL. XLV

FEBRUARY, 1950

No. 1

---

### CONCERNING NORTH AMERICAN SALDIDAE (HEMIPTERA).

By CARL J. DRAKE, Ames, Iowa.

The present paper contains the descriptions of three new species and one new variety of shore bugs or Saldidae from the United States. Notes are included on some European saldids found in North America, also a new record of a species from Argentina, which is widely distributed in the Western States. All records are from specimens in the Museum of Comparative Zoölogy and the writer's personal collection. The types of the new species are deposited as indicated beneath each description.

#### ***Saldula teretis* sp. n.**

Small, black, with short golden pubescence, the hemelytra margined with luteus. Head black, with usual yellowish spot between each ocellus and eye; callosities, tylus, jugae and labrum yellowish. Rostrum testaceous, extending between hind coxae. Antennae long, very slender, shortly pilose; segment I yellowish, without dark spot, stoutest and shortest; II pale brown, lighter apically; III and IV dark fuscous; proportions—I, 15; II, 30; III, 26; IV, 25. Legs testaceous, the hind femora with short, whitish hairs beneath; femora slightly darkened distally and with a few scattered dark spots; front margin of fore tibiae with an elongate dark spot at base and a shorter one at apex, slightly brownish for some distance beyond basal spot; hind tarsi pale, segments one and two subequal in length, each dark at tip.

Pronotum black, slightly shining, slightly more than three times as wide as long, deeply excavated behind, strongly narrowed anteriorly, a little wider in front than head without eyes, the lateral margins quite straight; callus moderately large, moderately convex, deeply and broadly impressed on the disc, not extending on lateral

margins; furrow between lobes arcuate, deep, pitted at the bottom, the pubescence slightly longer in furrow; hind lobe a little shorter than callus, indistinctly pitted. Scutellum slightly wider than long, with transverse impression in front of middle, faintly transversely rugulose behind, about as shining as pronotum, with antero-lateral angles deeply impressed. Hemelytra velvety brownish black, the marginal stripe yellowish and tinged with orange, about as wide as in *S. opacula*, the pubescence a little thinner than on pronotum; clavus darker at base, with subapical orange spot; inner corium with subapical and subbasal yellowish spots; outer corium with subapical orange spot; membrane slightly clouded with brownish, subhyaline, without spots, with four cells, the veins a little darker.

Length, 2.85 mm.; width, 1.40 mm.

Type, male, Caldwell, Idaho, July 8, 1926, C. J. Drake, in Drake Collection.

Resembles *S. opacula* Zett., but shorter, much slenderer, with slenderer antennae and straight lateral edges of pronotum. The deeply impressed antero-lateral corners of the scutellum are also very distinctive and peculiar to this species. The same structures also separate it from *S. saltatoria marginata* (Fieber).

*Saldula opacula* Zetterstedt.

This species is widely distributed in Alaska, Canada and United States, but it is not common in collections. All specimens examined so far have been of the typical form. Specimens have been examined as follows: Gould, Colo., Aug. 8, 1940; Wanshap, Utah, C. J. Drake and Floyd Andre; Lincoln, Nebr., June 21, 1912; Corvallis, Ore., June 26, C. J. Drake; Cranberry Lake, New York, July 10, 1920, C. J. Drake; Circle, Alaska, Aug. 30, 1936; Ottawa, Canada, Apr. 26, 1923, H. C. Curran; Boston, Mass. The American specimens agree very closely with specimens from Europe. *Opacula* is much larger and broader than the new species described above. The sides of the pronotum are moderately curved.

*Saldula xanthochila* (Fieber).

Yuma, Ariz., Aug. 19, 1937, C. J. Drake and Floyd Andre; Denver, Colo., 1898, E. D. Ball. The typical form of this species seems to be rather uncommon in the Western States. The marginal strip of the pronotum is long, very narrow, about as wide as an antennal segment. The stripe is much longer than in *S. argentina* (Berg).



*Saldula xanthochila limbosa* Horvath.

Many specimens; Caldwell, July 8, 1926, and Parma, Idaho, July 9, 1926, C. J. Drake; Salt Lake, Utah, Aug., 1937, Drake and Andre; Reno, Aug. 6, and Deeth, Nev., Aug. 8, 1937, Drake and Andre; Soap Lake, Wash., Aug. 16, 1912, A. C. Burrow; Fresno, Calif., June 26, 1926, C. J. Drake; Taft, Calif., Aug. 13, 1937, Drake and Andre. In variety *limbosa* Horv., the pale marginal stripe of pronotum is about three times as wide as the basal antennal segment. It also shows much variation in size, especially females. Specimens from Western United States agree very closely with the typical form and variety from Europe.

*Saldula argentina* (Berg).

This species is recorded in the literature from Argentina, Chile, Paraguay and Peru. Specimens have also been seen from Uruguay and southern Brasil. Many specimens are at hand from western United States as follows; Caldwell, Idaho, July 8, 1926, C. J. Drake; Pingree Park, Colo., Aug. 22, 1923, C. J. Drake; Fresno, Calif., June 20, 1926, C. J. Drake; Riverside, Calif., Aug. 16, 1937, Drake and Andre; Wilcox and Yuma, Ariz., Aug., 1937, Drake and Andre; Deeth, Nev., Aug. 6, 1937, Drake and Andre; Soap Lake, Wash., Aug., 1919, A. C. Burrill; Victoria, Brit. Col., June, 1925, C. J. Drake.

The stripe along the lateral margins of the pronotum is whitish or yellowish, and terminates before reaching front and hind margins. It is also visible from beneath. The pale pronotal stripe separate it at once from *S. pallipes* (Fabr.). The stripe is shorter than in *S. xanthochila* (Fieb.).

*Saldula pallipes* (Fieber).

This species and its several varieties are widely distributed in the Northern Hemisphere. It is the commonest saldid in United States. Specimens have been examined from Alaska, Canada, Quebec, Newfoundland, Cuba, Chile and almost every state in the United States. On account of the confusion in the literature and great variation in size and color of hemelytra, it seems advisable to treat the typical form and its varieties in a separate paper. *Saldula interstitialis* (Say) is one of the color form of *pallipes*. *S. saltatoria* (Linn.) and its varieties will also be discussed in same paper. The latter is also widely distributed in North America.

*Saldula explanata* (Uhler).

This species is much confused in collections and literature. It is fairly common in the Western States, and easily separated by its short pronotum, explanate margins of pronotum and elytra and dark color. The legs also tend to be quite dark, the femora above with a long pale stripe. Specimens have been studied as follows: Pingree Park, Colo., Aug. 17, 1924; Mt. Rainier, Summerland, Washington, Aug. 29, 1934, A. L. Melander; Wanship, Utah, Aug. 4, 1937, Drake and Andre; Lake Tahoe, Calif., Aug. 8, 1937, Drake and Andre; Victoria, B. C., June, 1924, C. J. Drake; Caldwell, Idaho, July 8, 1926, C. J. Drake; Deeth, Nev., Aug. 6, 1937, Drake and Andre.

*Saldula notalis* n. sp.

Moderately large, ovate, black, slightly shining, rather densely clothed with short, fine, suberect, yellowish brown hairs, the hairs short along the sides of pronotum, and denser on pronotum and scutellum than hemelytra. Head black, with few long hairs in front, the frontal callosities yellow. Antennae brownish black, shortly pilose; segment I short, stout, black, shining, with a large, elongate, brownish area; II yellowish brown apically; proportions—I, 24; II, 45; III, 29; IV, 30. Rostrum dark fuscous, shining, reaching to hind coxae. Legs testaceous; coxae black, narrowly testaceous apically; trochanters testaceous, the anterior pair beneath with large brown spot; femora largely testaceous, with scattered brownish spots above, beneath black, shining and with longer pale hairs; tibiae darker, the anterior pair with basal and smaller apical black spots, with faint brownish streak between spots; last tarsal segments darker, fuscous; coxal plates black, shining, the fore pair narrowly yellowish apically. Abdomen beneath black, the venter with short pale hairs.

Pronotum a little less than three times as wide as long, broadly excavated behind, moderately narrowed anteriorly, the side margins slightly rounded; callus moderately convex, not extending on explanate margins, occupying more than half of the length of pronotum, deeply and broadly impressed on disc, with a much shallower impression on each side; transverse furrow arcuate, deep, pitted at bottom; hind lobe about two-thirds as long as callus. Scutellum subequal in length and width, transversely impressed in front of middle. Hemelytra with brownish areas not conspicuous, the hairs shorter, especially on corium; inner corium with two apical and a subapical areas somewhat brownish; outer corium

with subapical spots and a short median, marginal streak brownish; clavus darker, with a little longer hairs, the subapical spot yellowish; membrane within, beyond cells, veins and margins along veins, and a wide streak in each cell dark fuscous, with four cells.

Length, 4.15 mm.; width, 1.75 mm.

Type (male) and one paratype, taken along a small stream north of San Francisco, C. J. Drake and Floyd Andre, in Drake Collection.

Separated from *S. saltatoria* (Linn.) by its larger size, short hairy clothing on dorsal surface, and differently marked hemelytra. It is shorter than *S. luctuosa* (Stal), and about as hairy. The latter is uniformly much blacker, more ovate and shorter, clothed with finer hairs, and the membrane is light fuscous without any spots in cells.

When viewed from the side, both *luctuosa* and *notabilis* have shaggy dorsal surfaces. The hairs along the margins of pronotum and hemelytra are quite short in both species, which distinguish them from the forms with long hairs. *S. illinoiensis* Drake, *S. andrei* Drake and *S. comatula* Parshley are differently marked and have much longer and more conspicuous hairs. *Notabilis* n. sp. looks much like typical *S. pallipes* but is readily distinguishable by its shaggy dorsal clothing.

#### *Saldula hirsuta* (Reuter).

*Acanthia hirsuta* Reuter, Rev. de Ent., 1888, VII, p. 60;

Acan. 1895, pp. 19, 26, 47.

This is the first record of the occurrence of *hirsuta* Reuter in the Americas. The typical form is rather black, slightly shining and rather densely clothed above with fine, dark, erect hairs. The hemelytra have large subbasal and subapical yellowish-orange, marginal spots. These large spots form almost semifascia, especially the subbasal. There is also a subapical spot in the corium. The antennae and color markings are the same as in European specimens at hand. The antennae are blackish, shortly pilose, the basal segment with a large, elongate, yellowish spot, the second yellowish apically; proportions—I, 18; II, 38; III, 24; IV, 23. Two specimens, San Francisco, Calif., Aug. 11, 1937, C. J. Drake and Floyd Andre.

#### *Saldula hirsuta pexa* n. var.

Differs from typical form in having the subapical spot of corium entirely wanting. The subbasal spot is usually replaced by two or

three small ones, which may also be wanting. There seems to be very little difference in the size of the subapical orange-yellow spot. The legs are largely testaceous, with femora beneath shining black. The front margin of fore tibia is blackish along the basal two-thirds and also at times has a black spot. In the European example of *hirsuta*, the front margins of all femora bear a long basal spot, a median long streak and an apical small black spot. In a couple of the paratypes, the femora and tibiae are pretty much darkened.

Until more specimens of *hirsuta* from Europe and American specimens of the typical form and new variety are available for comparison, it seems advisable to treat the specimens from United States as above. The color spots of the hemelytra are orange-yellow in all specimens so far examined. The variety is the same size as the typical form.

Type (male), allotype (female) and 4 paratypes, San Francisco, Calif., Aug. 11, 1937, C. J. Drake and Floyd Andre.

One specimen of the typical form was also taken at Taft, Calif., Aug. 13, 1937, by Drake and Andre. This is the first record of the occurrence of the species in the Western Hemisphere.

### *Saldula balli* sp. n.

Small, ovate, the pubescence short, prostrate, pale. Head black, yellowish brown in front, the jugae and callosities whitish, ocelli reddish, a small yellowish spot between each and eye. Rostrum long, dark ferrugineous, lighter apically, extending between hind coxae. Legs pale testaceous, the femora slightly embrowned within. Anterior coxal plates and tip of last venter whitish. Antennae moderately long, shortly pilose; segment I stout, whitish; II testaceous or pale brown; III and IV dark brown or blackish; proportions—I, 17; II, 27; III, 20; IV, 18.

Pronotum three times as wide as long, deeply excavated behind, strongly narrowed anteriorly, much narrower in front than head including eyes, the front lobe and wide median portion of hind lobe blackish, the rest, including under margins of pronotum, whitish testaceous, the lateral margins moderately rounded; lobes separated by arcuate impression, which is pitted at the bottom, the hind lobe one-half as long as front; callus moderately convex, not extending on explanate margins, with large deep impression on disc. Scutellum black, moderately raised, as long as broad, the transverse impression slightly in front of middle. Hemelytra whitish flavous; clavus with a dark rufous spot a little before apex of scutellum;

corium faintly embrowned apically, usually with a submarginal brown or fuscous spot beyond the middle; membrane transparent, with four cells, each with slight indication of brown spot, the veins brown.

Length, 3.00 mm.; width, 1.25 mm.

Type (male), allotype (female) and 9 paratypes, Sacaton, Ariz., May 6, 1933, E. D. Ball, after whom the insect is named. Two paratypes, Aztec, New Mex., Aug. 26, 1937, C. J. Drake and Floyd Andre, in Mus. Comp. Zoology. Type in Drake Collection.

The small size and pale color separate this species at once from other *Saldula*. The pale color of pronotum is a large area and forms no lateral stripe as in *S. xanthochila limbosa* Horvath. The species is only slightly shining, and largely pale in color.

---

### BOOK NOTES

**Principles of Insect Pathology.** By Edward A. Steinhaus. ix+757 pp., 219 figs., 6×9 ins., cloth bound. 1949. McGraw Hill Book Company, New York, N. Y. (Price, \$8.00)

This volume deals in large part with the abnormal conditions which result when the insect body is invaded by microorganisms although some attention is given to the pathology associated with other causes. As the preface states, the need of a textbook in this field was a pressing one since no reasonably complete treatment of the subject from the student's point of view was available. It also was realized that the subject was in need of a reference work. To meet the requirements both of the student and research worker, Dr. Steinhaus has made available in a single volume both a textbook and a reference work on insect pathology.

About 61% of the text is devoted to a consideration of the bacterial, fungous, virus, protozoan and nematode infections of insects and about 9% is devoted to a description of the pathological effects caused by agents or agencies other than microorganisms. The remainder of the text is concerned with the general aspects or principles of insect pathology and includes among other chapters on Resistance and Immunity, Infection and Epizootiology and Symptoms and Pathologies. Thirty eight pages are devoted to a subject index and the names of over 700 investigators are included in the author index.

Steinhaus is to be commended for bringing together in one concise volume the pertinent information concerning this relatively new field of entomology. GEORGE S. TULLOCH, Merrick, N. Y.

**NEW RECORDS OF NORTH AMERICAN NEMESTRIDAE; WITH DESCRIPTION OF A NEW *HIRMONEURA* FROM MEXICO (DIPTERA).**

By JOSEPH C. BEQUAERT, Cambridge, Massachusetts.

I am indebted to Mr. Paul D. Hurd, Jr., of the Division of Entomology and Parasitology, University of California, Dr. M. T. James, Department of Zoology, State College of Washington, Dr. Edward S. Ross, of the California Academy of Sciences, Mr. Floyd Werner, and Mr. W. Nutting for the privilege of studying some recent collections of Nemestrinidae. The additional records listed below include several interesting extensions of range, as well as an apparently undescribed race of *Hirmoncurea bradleyi*.

*Hirmoncurea (Hymnophlacba) texana* Cockerell.

MEXICO: Acapulco, Guerrero, one female, June 8, 1935 (A. E. Pritchard).

*Hirmoncurea (Hymnophlacba) brevirostris* Macquart.

MEXICO: Acapulco, Guerrero, three females, June 8, 1935 (A. E. Pritchard).

*Hirmoncurea (Neohirmoncurea) bradleyi novileonis* n. subsp.

*Male*. Agreeing in venation and structural characters with *H. bradleyi* J. Bequaert, and with the same general arrangement of dark and light longitudinal stripes on mesonotum and cross-bands on dorsum of abdomen. Differing only in the somewhat larger size and in some details of coloration as follows. (1) Wings much more strongly and uniformly smoky throughout, not appreciably darker anteriorly or basally. (2) Mesonotum with only three dull-brown pollinose stripes, without traces of the additional lateral dark stripes (near the wing bases) of the nominate form. (3) Cross-bands of abdomen dorsally more boldly marked, the pale bands with a yellowish (not white) bloom and fairly long, mostly pale yellow and somewhat golden hairs, mixed with a few black ones. Total length of body 16 mm.; of wing, 17 mm. The alula of the wing is decidedly narrower than in the nominate race. I can find no cogent difference in the male terminalia, at least the parts that can be examined without dissection.

MEXICO: Monterrey, State of Nuevo Leon, male holotype, July 21, 1935 (A. E. Pritchard). Type in Division of Entomology and Parasitology, University of California, Berkeley.

This fly is so similar in appearance and structure to *H. bradleyi*, known thus far only from Texas, that its relationships are adequately expressed by giving it subspecific status, at any rate until more specimens are available. It should be noted that in the nominate race the lateral, supra-alar dark stripes of the mesonotum may be more or less defined, being sometimes indicated anteriorly only.

*Neorhynchocephalus volaticus* (Williston).

MEXICO: Valerio Trujano, Oaxaca, 4,500 ft. (M. Embury); Las Animas, Sierra Laguna, Baja California (E. S. Ross and R. M. Bohart); Canipole, Baja California (E. S. Ross and R. M. Bohart); San Venancio, Baja California (E. S. Ross and R. M. Bohart); 10 miles northwest of La Paz, Baja California (E. S. Ross and R. M. Bohart); Acapulco, Guerrero, June 21, 1935 (A. E. Pritchard); Vera Cruz, Vera Cruz, July 10, 1935 (A. E. Pritchard). —REPUBLIC OF HONDURAS: Zamorano, Dept. Morazan, 2600 ft., one female, July 26, 1948 (T. H. Hubbell).

*Neorhynchocephalus sackenii* (Williston).

CALIFORNIA: 4 miles West of Quincy, Plumas Co., 5 females and 36 males, at and near flowers of *Achillea millefolium*, June 25 to July 2, 1949 (J. W. MacSwain, P. D. Hurd, L. Andres, V. E. Burton, W. H. Wade, R. L. Langston, and J. E. Gillaspay). —ARIZONA: Tumacacori Mountains, 15 miles West of Nogales, 2 females, June 20, 1949 (F. Werner and W. Nutting); Ft. Huachuca, 11 females and 9 males, July 26, 1949 (F. Werner and W. Nutting); 10 miles East of Sonoita, Sa. Cruz Co., 4800 ft., one female (F. Werner and W. Nutting); 5 miles North of Elfrida, Cochise Co., one female (F. Werner and W. Nutting).

*Trichopsidea (Parasymnictus) clausa* (Osten Sacken).

CALIFORNIA: Stoddard Mountain (Mohave Desert), San Bernardino Co., one female and one male, April 28, 1949 (R. F. Smith). —ARIZONA: Santa Rita Range Reservation, one female, August 15, 1949 (F. Werner and W. Nutting); Pinery Canyon, West side of Chiricahua Mountains, 5500 ft., one male, August 17, 1949 (F. Werner and W. Nutting).

These are the first records of the species for California and Arizona.

## AN ANNOTATED LIST OF UTAH CERAMBYCIDAE.

BY G. F. KNOWLTON AND S. L. WOOD, Logan, Utah

The writers are indebted to Professor J. N. Knull and Mr. W. S. Fisher for identifying nearly all of the beetles here recorded.

*Prionus californicus* Mots. Collected on numerous occasions throughout Utah.

*P. palparis* Say. Skull Valley, July 26, 1941 (G. F. Knowlton—H. F. Thornley).

*P. integer* Lec. Logan, July 30, 1939 (Knowlton—W. P. Nye).

*Tragosoma depsarium* var. *harrisii* Lec. Provo, Sept. 17, 1941 (Knowlton—W. D. Fronk); Logan Canyon, July 29, 1948 (S. L. Wood).

*T. depsarium* var. *repens* Csy. Blacksmith Fork Canyon, Sept. 3, 1938, and Logan Canyon, August 17, 1939 (Knowlton—G. S. Stains).

*Spondylus upiformis* Mann. Logan Canyon, July 31, 1947 (Wood); Bluebell, Sept. 9, 1935 (F. C. Harmston).

*Asemum atrum* Esch. Logan, June 21, 1940 (Nye), and July 14, 1941 (Knowlton); Logan Canyon, July 5, 1937 (Knowlton—C. F. Smith), and June 20, 1947 (Wood); Ogden, May 10, 1941 (D. R. Maddock); Vernal, June 13, 1940 (B. A. Haws).

*Tetropium velutinum* Lec. Logan Canyon, June 30, 1948 (Wood).

*Arhopalus productus* (Lec.). Logan, June 21, 1940 (D. Maughan); Vernal, July 11, 1940 (Haws).

*A. agrestis* (Kby.). Logan, July 16, 1903; Duchesne, Sept. 17, 1935 (W. W. Henderson).

*A. asperatus* (Lec.). Myton, Aug. 11, 1939 (Knowlton—R. A. Zirker); Randolph, July 26; Vernal, July 9, 1940 (Haws); Garden City, Aug. 10, 1937 (Knowlton—Harmston).

*A. montanus* (Lec.). Navajo Mt., July 30, 1936 (D. D. Jensen); Park City, Aug. 14, 1947 (J. M. Heslop).

*Methia mormona* Linell. Logan Canyon, on several occasions; Farmington, July 14, 1936 (H. F. Gunnell); Hanksville, Aug. 1, 1939 (Knowlton—Harmston); Vernal, July 19, 1941 (Knowlton—Thornley).

*Brothylus conspersus* Lec. Logan, June 1, 1947 (B. H. Popov).

*B. gemmulatus* Lec. Lynndyl, June 8, 1939 (Knowlton—Harmston).

*Romaleum hispicorne* (L.). Logan, Aug. 2, 1947 (Popov); Bountiful, July and Sept. 1941 (D. Ashdown); Ogden, June 2, 1941 (Maddock); Tooele, Aug. 21, 1940 (Thornley); Fillmore, Aug. 12, 1939 (D. L. Bischoff).



- Stenocorus inquisitor* L. Logan Canyon, July 1, 1939 (C. J. Davis), and May 26, 1948 (Haws).
- Toxotus lateralis* Csy. Collected throughout the northern two-thirds of Utah.
- T. vestitus* Hald. Logan, June 14, 1946 (H. S. Beaudoin); Brigham, June 10, 1947 (R. L. Rigby); Payson Ranger Station, Aug. 14, 1943 (Knowlton-Maddock); Vernal, June, 1941 (Haws).
- Pachyta lamed* (L.). Themonton, Aug. 26, 1941 (R. S. Roberts); Vernal, July 12, 1948 (G. G. Fleener); Yost, Sept. 1, 1940 (Knowlton).
- Cortodera militaris* (Lec.). Logan Canyon, July 24, 1938 (Nye).
- C. subpilosa* (Lec.). Logan, on numerous occasions.
- Acmacops pratensis* (Laich.). Logan, July 1, 1941 (Wood); Logan Canyon, June 6, 1939 (Knowlton-Nye); Duchesne, June 6, 1940 (Knowlton).
- Gaurotes cressoni* Bland. Logan Canyon, June 24, 1938 (Knowlton-Nye); Nephi, May 25, 1939 (Knowlton-Harmston).
- Anthophylax mirificus* Bland. Logan Canyon, July 9, 1939 (Davis), and June 16, 1946 (Wood).
- Grammoptera subargentata* Kby. Logan, several occasions; Provo Canyon, June 25, 1939 (Knowlton-Harmston); Currant Creek, June 29, 1939 (Knowlton-Harmston).
- Leptura propinqua* (Bland.). Monte Cristo, and Mt. Nebo, Aug. 12, 1943 (Knowlton-Maddock); Logan, Aug. 27, 1947 (Popov); Providence Lake, July 25, 1936 (Nye).
- Anoplodera instabilis* Hald. Common in Utah.
- A. canadensis* Fab. Logan, July 21, 1941 (Wood); Vernal, July 20, 1948 (Haws).
- A. canadensis* var. *ebena* Leng. Logan Canyon, July 20, 1940 (Stains-D. G. Hall).
- A. sanguinea* Lec. Logan Canyon, July 24, 1938 (Nye).
- A. chrysocoma* Kby. Common in Utah.
- Typocerus balteatus* Horn. Fruitland, Aug. 24, and Garden City, Aug. 9, 1948 (Knowlton); Newcastle, Sept. 15, 1938 (Knowlton-Harmston).
- Necydalis diversicollis* Schaeff. Bountiful, Aug. 10, 1941 (Ash-down).
- Rosalia funebris* Mots. Common in Utah.
- Semanotus ligneus* (Fab.). Logan, March and April, several occasions; Ogden, 1941 (C. L. Chadwick).
- S. ligneus* var. *ampla* Csy. Blacksmith Fork Canyon, Sept. 29, 1938 (Knowlton-Harmston).

- S. litigiosa* Csy. Logan, Utah during April, on several occasions.  
*Callidium antennatum* Newm. Logan, April 24, 1938 (Nye); Logan Canyon, July 1, 1939 (Davis); River Heights, May 29, 1942 (Wood).  
*C. antennatum* var. *hesperum* Csy. Logan, April 27, 1938 (Nye).  
*C. californicum* Csy. Logan, May 4, 1936 (Nye).  
*Phymatodes dimidiatus* (Kby.). Vernal, June 3, 1940 (Haws).  
*P. vulneratus* Lec. Logan, April 26, 1939 (Maughan).  
*P. varius* (Fab.). Tooele, July 21, 1936 (L. L. Hansen).  
*P. maculicollis* Lec. Logan, April 26, 1936 (Nye).  
*Xylocrius agassizi* (Lec.). Logan, April 13, 1942 (Ashdown).  
*Xylotrechus albonotatus* Csy. Logan Canyon, July 24, 1940 (Nye).  
*X. amosus* (Say). Logan Canyon, June 8, 1938 (Nye).  
*X. boveditchi* Hop. Logan Canyon, June 30, 1948 (Wood).  
*Necolytus caprea* (Say). Logan, several occasions; Bountiful, Aug. 8, 1941 (Ashdown).  
*N. muricatus* (Kby.). Logan, April 26, 1936 (Nye); Farmington, June 18, 1948 (M. W. Nielson); Ogden, June 11, 1941 (Maddock).  
*Oxophus corallinus* Lec. Common in Utah.  
*O. jocosus* Horn. Price, Aug. 9, Jensen, Sept. 4, Torrey and Teasdale, Sept. 9, 1938 (Knowlton-Harmston).  
*Crossidius ater* Lec. Currant Creek, Aug. 24, 1948, and Kelton, Sept. 30, 1942 (Knowlton); Promontory Point, Oct. 5, 1942 (Knowlton-W. E. Peay); Skull Valley, Aug. 21, 1938 (Knowlton-Hansen).  
*C. wickhami* Csy. Leamington, Aug. 14, 1938 (Henderson); Fool Creek Pass, Aug. 17, 1938 (Knowlton-Harmston).  
*C. pulchellus* Lec. Common in Utah.  
*C. hirtipes* Lec. Milford, Sept. 3, 1941 (Thornley).  
*C. allgetvahri* Lec. Curlew and Snowville, Aug. 22, 1931 (Knowlton); Roosevelt, June 24, 1937 (Harmston).  
*C. discoidens* (Say). River Heights, Sept. 13, 1942 (Wood).  
*Batyle ignicollis* (Say). Logan, July 21, 1941 (Wood); Brigham, June 18, 1947 (Rigby); Ogden, July 11, 1941 (Maddock); Provo, Aug. 4, 1937 (Hansen); Pleasant View, June 14, 1939 (Knowlton).  
*Batyleoma suturale* (Say). Springville, May 11, 1940 (Stains-J. Woodward).  
*Monochamus clamator* Lec. Roosevelt, July 14, 1938 (Knowlton-Harmston).

- M. clamator* var. *latus* Csy. Logan, June 28, 1948 (R. S. Bailey).  
*M. oregonensis* Lec. Common in Utah.  
*M. scutellatus* (Say). Logan Sept. 18, 1938 (Nye).  
*Hyperplatys montana* Csy. Logan, June 29, 1947 (Popov);  
 Beaver, June 16, 1948 (Wood).  
*H. aspersa* (Say). Logan, May 1, 1936 (Harmston).  
*Acanthocinus spectabilis* Lec. Vernal, July 11, 1940 (Haws).  
*Pogonocherus (Eupogonocherus) parvulus* Lec. Boulder Mt.,  
 Aug. 2, 1939 (Knowlton).  
*Poliaenus oregonus* (Lec.). Logan Canyon, July 1, 1939 (Davis)  
 and July 1, 1947 (Wood).  
*Saperda horni* Joutel. Logan Canyon, May 21, 1939 (Knowlton-Nye); Logan, June 26, 1941 (G. A. Wahlquist); Ogden,  
 Sept. 19, 1941 (W. D. Fronk); Lehi, Aug. 9, 1945 (Knowlton).  
*S. calcarata* Say. Myton, Sept. 10, 1939 (Knowlton-R. L. Zirker).  
*Mecas inornata* (Say). Salt Lake City, July 2, 1939 (Knowlton);  
 Lindon, July 13, 1937 (Hansen); Layton, June 27, 1940 (Nye).  
*M. bicallousa* Martin. Common in the northern half of Utah.  
*Oberia bimaculata* var. *montanus* Csy. Common in the northern  
 half of Utah.  
*Tetraops canescens* Lec. Logan, July 7 and Mt. Carmel, July 14,  
 1948 (Knowlton-Wood); Vernal, July 8, 1940 (Haws).  
*Tetraops femoralis* Lec. Common in Utah.  
*T. collaris* Horn. Logan, July 21, 1941 (Wood); Logan Canyon,  
 July 10, 1948 (Bailey).

---

**Wohlfahrtia Less Troublesome.** Before the use of DDT became general for fly control, *Wohlfahrtia opaca* (Coq.) larvae not uncommonly caused serious losses of kit-mink to fur breeders in Utah. Recent inquiry has indicated that wherever extensive DDT fly control campaigns have been conducted in the general area of fur farms, infestation of kit-mink by *W. opaca* larvae has been rare, even when the mink have been reared outside, instead of in the screened houses which were used formerly. Likewise, infestation occurring in silver foxes and persons apparently has decreased in Utah during the past four years. G. F. KNOWLTON, Logan, Utah.

**SCIARA (NEOSCIARA) BEEBEI, A NEW SPECIES  
OF SCIARIDAE HAVING MIGRATORY LARVAE.**

By F. R. SHAW and M. M. SHAW, Amherst, Mass.

Included in some specimens of insects collected by Dr. William Beebe at Rancho Grande, Venezuela on July 9, 1946 and June 20, 1948 there is a new species of Sciaridae having migratory larvae. Masses of larvae were collected on June 20, subsequently some of these pupated and a few adults emerged.

The larvae are typical Sciarids having black heads and white bodies. There are eight pairs of spiracles, one prothoracic and seven abdominal. The larvae are legless and are about 20 mm. in length. We plan to publish a description of the larvae and pupae in the future.

The formation of migratory processions of Sciarids has been reported by several authors. Nowicki (1868) described a species *Sciara militaris* whose larvae formed processions. Beling (1883) published a paper on armyworms or "Heerwurms" which were larval Sciarids. Osten Sacken (1886) states that such migrations form when the larvae are searching for better sources of food. Johannsen (1912) has reported migratory Sciarids from North America.

The adult specimens reared by Dr. Beebe all proved to be males. Some specimens failed to develop normal wings but were of value for a study of other characters.

***Sciara (Neosciara) beebei* n. sp.**

Male—Length  $6\frac{1}{2}$  mm. (alcoholic material). General color dark brown. Wing, figure 1, infuscated. Head—dark brown above but lighter ventrally. Antennae sixteen segmented, segments longer than broad. Ocelli 3, prominent, located in triangular raised area dorsal to the eye bridge. Mouthparts—light brown, palpi 4 segmented; labellar lobes large. Thorax dark brown. Mesonotum mainly dark, scutellum and metanotum reddish brown. Costa, subcosta and radius brown. Media and cubitus yellow. Costa produced about  $\frac{3}{5}$  distance from tip of Rs to  $M_1 + 2$ . Sc short, not more than  $\frac{1}{6}$  the length of cell R, ends free.  $R_1 + 2$  ends slightly beyond fork of media. Petiole of media about  $\frac{1}{3}$  longer than  $R_1 + 2$ . Petiole of cubitus about  $\frac{3}{4}$  the length of the basal section of media. Branches of cubitus widely separated at wing margin, distance between them being more than the distance from  $M_3 + 4$  to  $Cu_1$ . Halteres light brown in color. Legs—coxae and

trochanters dark brown, remaining segments somewhat lighter. Femora, tibiae and tarsi covered with dense black spines.

Abdomen—first three segments somewhat paler than succeeding four. Hypopygium, figure 2, large, dark brown. Between basi-



FIG.1 WING OF  
SCIARA BEEBEI

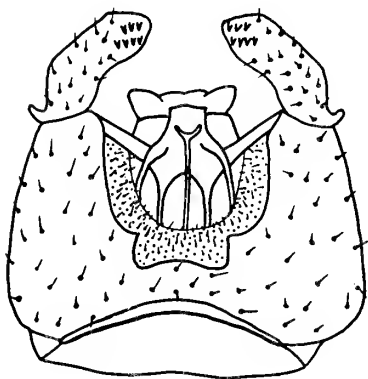


FIG.2 HYPOPYGIUM OF SCIARA BEEBEI  
VENTRAL VIEW

styles there is a membranous area having a dense covering of fine setae next to the basistyles. Dististyles with a small hook-like structure at the basal lateral portion. At the tip of inner face of the dististyles one row of three and a parallel row of four spines.

In Petzey's key (1918) this species would run to *Neosciara picca* Rubsaamen which was based on a female. We have no records to indicate that males of *picca* have been described. Since we lack material of *picca* for comparison, it is considered better to describe our males as a new species. The type and paratypes are in the Shaw collection.

We take pleasure in naming this species for Dr. William Beebe. A description of the migratory habits of this insect can be found in "High Jungles" a book recently published by Dr. Beebe.

#### LITERATURE CITED

- Beebe, W.** 1949. *High Jungles*. Duwell, Sloan and Pearce, New York, N. Y.
- Beling, Th.** 1883. Der Heerwurm, die Heerwurmsmuche und die Thomastravermuche. *Zeits. f. die ges. naturw.* 46: 253-271.
- Johannsen, O. A.** 1912. The Mycetophilidae of North America. *Maine Agric. Exp. Sta. Bul.* 200: 57-146, figs. 24-267.
- Nowicki, Max** 1868. (Larval habits of *Sciara militaris*). *Verb. naturf. ver. in Brunn* p. 58, pl. 1.
- Osten Sacken, C. R.** 1886. Characters of the Larvae of Mycetophilidae. *Proc. Ent. Soc. Phil.* 1: 151-172, pl. 2.
- Petty, F. W.** 1918. A Revision of the genus *Sciara* of the family Mycetophilidae. *Ann. Ent. Soc. Amer.* 11: 319-342, pls. 30-31.
- 

#### NOTICE

##### IXth International Congress of Entomology.

The IXth International Congress of Entomology will be held August 17th-24th, 1951, in Amsterdam (Netherlands). Entomologists wishing to receive in due course programs and application forms are requested to communicate now with the Secretariate, c.o. Physiologisch Laboratorium, 136 Rapenburgerstraat, Amsterdam.

## A SYNOPSIS OF MARICOPODYNERUS (HYMENOPTERA: VESPIDAE).

By RICHARD M. BOHART, Davis, California.

In 1908 Henry Viereck proposed the subgenus *Maricopodynerus* for a new species of *Odynerus* from Oak Creek Canyon, Arizona. This species was remarkable for its greatly enlarged, bell-like second tergite which covered the third and following abdominal segments. The same species from Jerome, Arizona was described later in the same year under another name by Peter Cameron. When the old genus *Odynerus* was divided, *Maricopodynerus* was raised to a genus containing only the type species, *maricoporum*. Two additional species were recently described by the author<sup>1</sup> from Lower California and a study of additional material reveals 6 more new ones described below from various sections of western North America. All of these have the following generic characters which taken together distinguish them from related genera: Second tergite bell-shaped so that its median length is more than twice that of the second sternite; second tergite with a membranous apical margin; first sternite much broader than its median length; second sternite flat.

The genus is rare in collections as attested by the fact that less than 150 specimens have been noted in the principal collections of the country. Those from which material was borrowed for study are the California Academy of Sciences, U. S. National Museum, Museum of Comparative Zoology at Harvard, University of California, Oregon State College and Washington State College. Individuals who have contributed specimens are E. G. Linsley, H. and M. Townes, E. Gehrhardt, N. W. Frazier, C. D. Michener, M. Cazier and P. H. Baldwin.

Considering the pronounced structural peculiarities of the genus, distinctions between species are disappointingly few. Except for *sericifrons* the male genitalia and antennae are fairly similar. Punctuation differences are obvious, but subject to some variation even in a single locality. The mandible shape is remarkable for *permandibularis* but apparently uniform for the other species. The most useful structural feature in the genus as a whole is the shape of the clypeus, and the degree of emargination of its apex is fairly

<sup>1</sup> Bohart, R. M. 1948. Contributions toward a knowledge of the insect fauna of Lower California, no. 9, Hymenoptera: Eumeninae. Proc. Calif. Acad. Sci. (4th ser.) 24: 313-336.

constant within a species as well as similar in the 2 sexes. The shading of the wing membrane appears to be of group significance in *Maricopodynerus*, although this character is not always reliable in other genera of Vespidae.

#### KEY TO THE SPECIES OF MARICOPODYNERUS

1. Membrane of apical wing cell clear or uniform in color . . . . . 2  
     Membrane of apical wing cell stained toward apex . . . . . 5
2. Wing membrane water clear and with sparse microsetae (about 50 in apical cell) ; membrane at apex of tergite II not extending around sides ; male clypeus with dense silvery hair which obscures puncturation ; male last antennal segment shaped like a parrot bill and higher than broad.  
     *sericifrons* R. Bohart  
     Wing membrane at least slightly tinted, microsetae abundant (many hundreds in apical cell) ; membrane at apex of tergite II continued at least a short distance around sides ; male clypeus not densely haired ; male last antennal segment flattened dorsoventrally . . . . . 3
3. No interantennal carina ; body markings extensively brownish-red . . . . . *chisosensis* R. Bohart  
     A sharp interantennal carina leading from clypeus . . . . . 4
4. Clypeus shallowly emarginate, all black in female, black-rimmed in male . . . . . *rudiceps* R. Bohart  
     Clypeus with some red and white markings in female, male clypeus with apex reddish or pale.  
     *maricoporum* (Viereck)
5. Pale margin of tergite II restricted to apex, leaving lateral spot isolated ; male clypeus black-rimmed and with sharply incised apex . . . . . *decorabilis* R. Bohart  
     Pale margin at apex of tergite II extending anteriorly along sides and approaching or joining lateral spot . . . . . 6
6. Mandible thickened and bluntly curved toward apex ; subapical depression at middle of tergite II faintly but distinctly punctured, rest of tergite impunctured along mid line ; female only known . . . . . *permandibularis* R. Bohart  
     Mandible slender toward apex . . . . . 7
7. Subapical depression at middle of tergite II appearing impunctured at ordinary magnifications, first 2 tergites almost impunctured . . . . . *pulvipilus* R. Bohart  
     Subapical depression at middle of tergite II distinctly punctured . . . . . 8



8. Abdominal puncturation greatly reduced; male clypeus with moderately incised reddish apex . . . . . *lissus* R. Bohart  
Abdominal puncturation moderate; male clypeus with a very shallow, brownish incision, almost truncate.

*shannoni* R. Bohart

Genus *Maricopodynerus* Viereck

*Odynerus* (*Maricopodynerus*) Viereck, 1908. Trans. Amer. Ent. Soc. 33: 397, type: *O. maricoporum* Viereck.

*Maricopodynerus maricoporum* (Viereck)

*Odynerus maricoporum* Viereck, 1908. Trans. Amer. Ent. Soc. 33: 397, male, type locality: Oak Creek Canyon, Arizona.

Distribution.—Arizona, California, Nevada, Colorado.

*Maricopodynerus pulvipilus* R. Bohart

*Maricopodynerus pulvipilus* R. Bohart, 1948. Proc. Calif. Acad. Sci. (fourth series) 24: 321, male, female, type locality: Tortuga Island, Gulf of California.

Distribution.—Lower California.

*Maricopodynerus permandibularis* R. Bohart

*Maricopodynerus permandibularis* R. Bohart, 1948. Proc. Calif. Acad. Sci. (fourth series) 24: 321, female, type locality: Tiburon Island, Gulf of California.

Distribution.—Known only from type locality.

***Maricopodynerus sericifrons* n. sp.**

Male.—Black with red and ivory markings. Red are: mandible mostly, flagellum, sutures on dorsum of thorax, spot on tegula, propodeum mostly on side and in concavity, legs largely, tergite I basally, II laterobasally and on apical membrane, III and following, sternite I entirely, II and following mostly. Ivory are: clypeus, 2 interantennal spots, ocular emargination dot, scape in front, dot on mandible base, front half of pronotum above, tegular spot, mesopleural spot, 2 large spots on scutellum and small ones on post-scutellum, tibial spots, emarginate bands on tergites I and II. Wing membrane mostly water clear, microsetae sparse, about 50 in apical cell. Clypeus and frons with dense silvery hair, rest of body with similar but less conspicuous pubescence. Puncturation moderate, punctures of pronotum well separated. Last 2 antennal segments relatively stout, last one parrot bill like and higher than broad; clypeus about 1.5 times as broad as long, with a rounded apical emargination; interantennal area not ridged; humeral angle sharp; mid femur swollen at apical one-third as seen from above

and excavated below; tergite II longer than broad, with membrane restricted to apical margin, not extending as far as apex of sternite II. Aedeagus very broad at apex and with a deep, membrane-filled emargination, hardly constricted subapically and broader there than subbasally; paramere slender and with styliform apex obtusely bent inward. Length to apex of second tergite 7.0 mm.

Female.—Characters about as in male but clypeus red with black above, front tibia red, pubescence of head less dense, clypeus with distinct but well-separated punctures, mid femur with swelling less pronounced. Length to apex of second tergite 8.0 mm.

Holotype, male, Calif. Acad. Sci. Ent. no. 6136, 2 mi. W. Edom, Riverside Co., Calif., Mar. 8, 1936 (E. G. Linsley). Paratypes, 7 males and 12 females from the following localities in southern California: Edom. (E. G. Linsley), Colorado Desert (H. S. Gentry), La Quinta and Needles (P. H. Timberlake), Palm Springs and Indio (P. H. Timberlake), Mecca and Painted Canyon (P. H. Timberlake). Collecting dates were in March, April, May, June and October.

This species is perhaps the most distinct of the genus by virtue of its clear wings, silvery pubescence and peculiar male antennae and aedeagus.

### **Maricopodynerus chisosensis** n. sp.

Male.—Black with brownish red and ivory markings. Brownish red are: antenna and mandible mostly, hind margin of pronotum, tegula partly, wing veins basally, propodeum and legs mostly, tergite I except narrowly at apex, tergite II at base and narrowly around pale marks, a pair of spots at apex of II, venter mostly. Ivory are: scape in front, tiny spot at base of mandible, clypeus, interantennal and ocular spots, postocular spot, rather narrow humeral margin, mesopleural and tegular spots, 2 spots on scutellum, stripe across postscutellum, spots near apex of front and mid femora, tibial lines, wavy apical margins of first 2 tergites, that of II connecting with a large subbasal lateral spot. Wing membrane faintly tinted, microsetae abundant. Body with inconspicuous fine silvery pubescence, some upright pale hair on front and vertex. Puncturation moderately close, punctures of pronotum mostly separated by less than a puncture diameter. Last 2 antennal segments small and slender. Clypeus about 1.3 times as broad as long, with a broadly v-shaped apical emargination; interantennal area rounded off, not ridged; humeral angle slightly obtuse, shoulders broad; mid femur slightly swollen toward apical one-

third as seen from above; tergite II a little longer than broad, with membrane extending back along side almost to middle of sternite II. Aedeagus (when flattened) with subapical constriction about one-half as broad as subbasal one; paramere broadly rounded at apex and with a small subapical inner notch. Length to apex of second tergite 7.0 mm.

Female.—Characters about as in male but no yellow spots on scape, mandible or femora; clypeus red with basolateral spots, angular apical emargination slightly obtuse, punctures coarse and close. Length to apex of second tergite about 9.0 mm.

Holotype, male, U. S. National Museum, Chisos Mts., Brewster Co., Texas, June 10–12, 1908 (Mitchell and Cushman). Paratypes, 8 females, same data as type.

This species is related to *maricoporum* but is somewhat more robust. Also the difference in the interantennal area is striking.

#### **Maricopodynerus rudiceps n. sp.**

Male.—Black, marked with red and whitish. Red are: mandible at apex, labrum, flagellum beneath, spot at side of propodeum, legs mostly, basal half of tergite I. Third and following abdominal segments reddish brown. Whitish are: clypeus except for black edging all around, small spot on flagellum, ocular and postocular spots, narrow humeral margin, 2 spots on tegula, mesopleural spot, 2 spots on scutellum, narrow stripe across postscutellum, minute spots on mid and hind tibiae, apical margins of tergites I and II, that on II undulate and joining lateral spot, posterolateral spot on sternite II. Wing membrane slightly yellow stained, microsetae abundant. Pubescence pale and inconspicuous. Punctuation moderately dense, punctures of pronotum nearly contiguous. Last 2 antennal segments slender, reaching nearly to middle of X; clypeus about 1.3 times as broad as long, apical emargination angular but very shallow, apex about as broad as 2.5 ocellus diameters; interantennal ridge sharp; humeral angle obtuse; mid femur slightly irregular but not noticeably swollen at apical one-third; tergite II a little longer than broad, with membrane extending back about to middle of sternite II. Aedeagus with subapical constriction about one-half as broad as subbasal one, paramere very broad toward apex, pointed but not notched or recurved. Length to apex of second tergite 6.5 mm.

Female.—Characters about as in male but with clypeus all black and antenna usually so. Humeral margin stripe sometimes broken. Abdominal sternites usually brown except for first one. Clypeus

with coarse, striatiform punctures, apical emargination a shallow v, apex about as broad as 2 ocellus diameters. Length to apex of second tergite about 9.0 mm.

Holotype, male, Calif. Acad. Sci. Ent. no. 6137, Verdi, Nevada, May 31, 1931 (L. S. Slevin). Paratypes, 8 males and 16 females from the following localities: Nevada: Mt. Montgomery (R. Bohart), Verdi (L. S. Slevin); California: Davis Cr. and Lassen Cr., Modoc Co. (C. L. Fox), Mammoth, Mono Co. (R. and G. Bohart); Arizona: Flagstaff (F. C. Pratt); Idaho: Craters of the Moon (R. Bohart), Lewiston (C. L. Fox); Colorado: Rifle (S. A. Rohwer); Montana: Helena; Oregon: Hereford, Baker, and 47 mi. E. Burns (H. A. Scullen), Abert Lake (Gray and Schuh); Washington: Asotin (I. McCracken); Utah: Hansel.

The reddish coloration varies considerably in extent in the paratypes, some specimens being a little more red than the type, others with very little red. Essential characters are the broad and shallowly incised clypeus of both sexes combined with the dense puncturation over much of the body, and the clear apical wing cell.

***Maricopodynerus decorabilis* n. sp.**

Male.—Black with whitish and a few reddish markings. White are: clypeus except for dark rim all around, scape in front, ocular and postocular spots, humeral margin, 2 spots on tegula, mesopleural spot, 2 spots on scutellum, broken line across postscutellum, apical margins of tergites I and II, that of II not attached to a lateral spot, dot at side of apex of sternite II. Red are: mandible apex, flagellum beneath, tegula largely, tarsi partly. Wing membrane slightly stained, apical one-third of apical cell brownish, microsetae abundant. Pubescence pale fulvous, inconspicuous, some upright hair on front. Puncturation moderate and close on head and thorax, fine but evenly dispersed and well separated on abdominal tergites I and II. Last 2 antennal segments small, reaching to basal one-fourth of segment XI. Clypeus slightly broader than long, apex about as broad as 2 ocellus diameters, emargination rounded, about twice as wide as deep; interantennal area distinctly carinate; humeral angle slightly obtuse; mid femur only slightly irregular in top view; tergite II with membrane extending about to apex of sternite II, white-marked areas scarcely swollen, tergite about as broad as long in dorsal view. Aedeagus with subapical constriction about three-fifths as broad as subbasally where it is hardly constricted; paramere with a stout, peglike apex delimited by a sharp subapical bend on inner margin. Length to apex of second tergite 7.0 mm.

Female.—Characters about as in male. Clypeus black or with lateral white spots, scape black except for a little reddish at base, humeral margin broken into 3 or 4 spots, legs and first abdominal segment extensively reddish, no spots on sternite II. Clypeus with rather coarse, striatiform punctures. Length to apex of second tergite 9.0 mm.

Holotype, male, Calif. Acad. Sci. Ent. no. 6138, Leavitt Meadows, Mono Co., Calif., June 25, 1937 (E. Gehrhardt). Paratypes, 3 males and 3 females from the following localities: Klamath Falls, Oregon (C. L. Fox); Blitzen Valley, Harney Co., Oregon (S. G. Jewett); Merrill, Oregon (C. C. Wilson); "Nevada". I have also seen an imperfect female specimen from Keeler, Inyo Co., California (N. W. Frazier).

As in most members of the genus, markings are variable. Some males have the first tergite and legs mostly red. In general, however, the coloration is darker than usual in the genus. The shape, color pattern, and relatively fine puncturation of the second tergite are diagnostic.

#### ***Maricopodynerus lissus* n. sp.**

Male.—Black with whitish and red markings. White are: clypeus, scape in front, ocular and postocular dots, humeral margin, mesopleural and scutellar spots, line across postscutellum, 2 spots on tegula, spot on front femur, lines on tibiae, sinuate apical margins of first 2 tergites. Reddish are: mandible mostly, emargination of clypeus, flagellum beneath, labrum, hind pronotal margin, tegula mostly, wing veins basally, propodeum partly, legs mostly, first abdominal tergite partly. Forewing brown-stained, especially along front margin, microsetae abundant. Pubescence minute, silvery, that of clypeus forming 2 spots in some lights, some upright hair on front. Puncturation moderate on head and thorax, punctures mostly separated by less than a puncture diameter. Puncturation of abdomen fine on tergite I, coarse at sides and apex of II, practically absent over base and middle of II. Last 2 antennal segments moderately small, reaching to base of segment XI. Clypeus a little broader than long, apex about as broad as 1.5 ocellus diameters, emargination narrowly rounded, about twice as wide as deep; interantennal area with a distinct carina; humeral angle somewhat obtuse; mid femur only slightly irregular in top view; tergite II distinctly longer than broad, with membrane extending toward middle of sternite II. Aedeagus with subapical constriction about three-fifths as broad as subbasal one; paramere slender

toward apex, gently curved, fingerlike, bluntly rounded at tip. Length to apex of second tergite 8.0 mm.

Female.—Characters about as in male. Clypeus red at apex, black basally and whitish laterally or across middle; scape red in front; femora red, darker basally. Clypeal punctures coarse but only slightly striatiform. Length to apex of second tergite 9.0 mm.

Holotype, male, Calif. Acad. Sci. Ent. no. 6139, Maricopa Mts., Arizona, April 14, 1947 (H. and M. Townes). Paratypes, 11 males, same data as type, 3 females, San Xavier Mission, Arizona, October 15, 1936 (E. P. Van Duzee); 1 female, Parker Dam, California, Nov. 23, 1936 (P. H. Timberlake).

The almost smooth base and middle area of the second tergite is a striking character approaching *pulvipilus*, of which it may represent a subspecies. The shape of the clypeus and other body features including male genitalia are almost exactly as in *pulvipilus*. Some males have the second tergite more extensively punctured, so this character is not wholly reliable. The moderate, almost v-shaped, reddish-tinted clypeal emargination of both sexes and the brown-stained wing margin appear to be consistent.

#### **Maricopodynerus shannoni** n. sp.

Male.—Black, marked with ivory and some reddish. Ivory are: clypeus mostly, basal mandible spot, scape in front, ocular and post-ocular dots, humeral margin, mesopleural and scutellar spots, 2 spots on tegula, transverse spot on postscutellum, dot on front femur, tibial streaks, wavy hind margins of tergites I and II, that on II connected with a mediolateral spot. Reddish are: flagellum beneath, narrow apical and apicolateral clypeal margin (reddish-brown), mandible mostly, labrum, stains along hind pronotal margin and other thoracic sutures, propodeum near juncture of abdomen, tegula largely, legs partly, stains on sternites and subapically on tergite I. Wing veins reddish basally, brownish apically, membrane clouded slightly along fore margin of forewing, apical cell brownish over its apical one-third. Pubescence minute, pale, inconspicuous; silvery at sides of clypeus and lower part of frons. Puncturation moderate, punctures of clypeus well separated, those of pronotum almost contiguous, those of tergites I and II finer and separated by more than a puncture diameter. Clypeus about 1.5 times as broad as long, apex barely concave, about 1.8 ocellus diameters wide, central area of clypeus bulging; last 2 antennal segments small, reaching about to base of XI; interantennal area with a tubercle and weak carina; humeral angle obtuse; mid femur

almost regular as seen from above; tergite II distinctly longer than broad, apical membrane extending nearly to base of sternite II. Aedeagus with subapical constriction about three-fifths as broad as subbasal one; paramere fairly stout toward apex, bluntly rounded, weakly angled subapically on inner margin. Length to apex of second tergite 6.5 mm.

Holotype, male, Calif. Acad. Sci. Ent. no. 6140, Stratford, Washington, July 4, 1920 (R. C. Shannon). Paratype, 1 male, Lake Paha, Washington, July 20, 1920 (R. C. Shannon). I have also seen a pair from Mono Co., California and a female from Nebraska which may be of this species. They have the nearly truncate clypeus and wing markings. Slight differences in puncturation make this somewhat doubtful and association of the sexes will have to wait until a series is collected at one locality. The clypeus and wing characters separate it from other known species.

---

**Back Issues of the Society's Publications.** During the past year the Society's stock of past issues of the **Bulletin** and **Entomologica Americana** has been rearranged so as to facilitate the prompt handling of orders. All orders for all publications **MUST** be sent **DIRECT** to Brooklyn Entomological Society, R. R. McElvare, Treasurer, 26 Bogart Avenue, Port Washington, New York.

PREVALENCE OF *AMBLYOMMA CAJENNENSE*  
IN TEXAS WITH AN ADDITIONAL  
LOCALITY RECORD.

By RICHARD B. EADS and GEORGE C. MENZIES, Austin, Texas.

It has long been felt that the "lone star" tick, *Amblyomma americanum*, is the only species in the Gulf Coast region which occurs in sufficient larval numbers in the field to justify universal condemnation under the broad designation of "wood" tick, or "seed" tick. *Americanum* larvae and nymphs occur by the thousands in grass, weeds and low shrubbery over a wide area of East and South Texas, particularly during the spring and summer months.

In December, 1948, an additional species of *Amblyomma* was encountered in numbers rivaling the more severe infestations of *americanum*. While collecting ectoparasites in South Texas, near Corpus Christi, on the Federal Game Refuge, Aransas County, Texas, we were attacked by tremendous numbers of *Amblyomma* larvae. Even though it was early winter, past experience indicated that *americanum* was involved. However, a good series of laboratory reared adults proved to be *A. cajennense*. Adults of this species were removed from the cattle, deer and peccary which were common on the Aransas Game Refuge.

*A. cajennense* is of considerable economic importance in the American tropics. Various authorities report that it persistently attacks man in South America, Central America and Mexico, particularly in the immature stages. From United States collection records the tick appears well established only in Texas. Cooley and Kohls (1944) list it from the following counties: Brooks, Cameron, Hidalgo, Jim Wells, Kenedy, Kleberg, Nueces, Starr and Willacy. Bishopp and Trembley (1945) add the additional counties of Aransas, Live Oak and Uvalde.

These counties are in the southern tip of the state, generally considered the usual range of *cajennense*. However, during Q fever studies, twelve adults of this species were removed from a cow near Austin, Texas (Travis County), April 6, 1949. The specific determination was verified by Glen M. Kohls, Rocky Mountain Laboratory, U. S. Public Health Service. The host animal, to which the ticks were firmly attached, had been in this Central Texas County for three years since being bought as a calf in West Texas. It was determined that no cattle on the ranch had been brought in from South Texas for several years. This record represents a considerable extension of the United States range of *A. cajennense*.



Two subsequent visits were made to the same locality in May and June, 1949, but only *Amblyomma americanum* were taken.

#### LITERATURE CITED

- Bishopp, F. C. and Trembley, H. L. 1945. Distribution And Hosts Of Certain North American Ticks. *Jour. of Parasit.*, 31(1): 1-54.
- Cooley, R. A. and Kohls, G. M. 1944. The Genus *Amblyomma* (Ixodidae) In The United States. *Jour. of Parasit.*, 30(2): 77-111.
- 

**Bilateral Abnormality of the Antennae in *Ptochiomera nodosa* (Hemiptera, Lygaeidae).** Hemipterists not infrequently encounter individuals of various species in which an antenna has failed to develop normally, so that two segments are fused into one. Such cases are usually asymmetrical, being confined to one side of the body only while the other antenna is entirely normal.

It is of interest, therefore, to note the capture of a *Ptochiomera nodosa* (Say) at Lakeland, Florida, October 1, 1949, in which both antennae have only three segments instead of the usual four. In normal individuals of this species each segment of the antenna has its own characteristic form and color. The terminal segment of the specimen in question has the typical shape and coloration of the fourth segment of a normal antenna, so that this individual gives the impression of lacking the *third* segment of each antenna.

The first segment of both antennae is normal, 0.29 mm. long by 0.09 mm. in thickness. The second segment of the right antenna likewise is normal, being 0.48 mm. in length and gradually increasing in thickness from 0.04 mm. at the base to 0.09 at the apex, but the same segment of the left antenna measures 0.53 mm. in length. The "third" or terminal segments are fusiform, 0.14 mm. in maximum thickness, black in color but becoming pale toward the apex, the right one 0.51 mm. long and the left measuring 0.66 mm. in length. The total length of the right antenna is 1.29 mm., of the left one 1.48 mm.

For comparison, measurements were made of an individual with normal antennae whose four segments are respectively 0.29, 0.48, 0.43 and 0.49 mm. in length, and 0.09, 0.09, 0.15 and 0.14 in maximum thickness. The total length of this normal antenna is thus 1.69 mm. In both these individuals the total width of the head is 0.60 mm. and the interocular width is 0.35 mm. ROLAND F. HUSSEY, Lakeland, Florida.

**Notes Concerning Nabis Feeding.**—A *Nabis alternatus* Parsh. was collected on June 28, 1945, in net sweepings, in a wide meadow 10 miles north of Panguitch, Utah, while still holding on to a Borborid fly, *Leptocera* sp. (Det. D. G. Hall), upon which it was feeding. Only when held in the writer's hand did the damsel-bug release its dead prey. An adult *N. ferus* was observed to be feeding on a winged *Aphis bakcri* Cowen on red clover at Garland, Utah, July 7, 1942. When disturbed it walked away, dragging its prey at the end of its beak. An *alternatus* was observed to be feeding on a yellowish-green winged psyllid in a sugar-bet seed field at St. George, Utah, May 6, 1943. Evidently this psyllid came from nearby boxelder trees, which were moderately infested with the psyllid *Psyllus negundinis* Mally. At Milford, Utah, June 11, 1943, a *Nabis* (probably *alternatus*) nymph was feeding on a slender mirid nymph. In this alfalfa field, a heavier than usual population of internally parasitized pea aphids was found and *N. alternatus* was moderately abundant. North of Beaver, Utah, a nymphal *Nabis alternatus* was found to be feeding on a mature wingless aphid, *Capitophorus clongatus* K., on *Chrysothamnus nauseosus*. A *Capitophorus fragaeifolii* (Ckll.) on rose at Sunset, Utah, was being fed on by a *N. alternatus*, October 10, 1944. Small numbers of this same aphid were present on rose at Flagstaff, Arizona, September 23, 1944.

At Gandy, Utah, on the night of August 7, 1945, a trap light was operated from a car battery. Large numbers of Staphylinid beetles and other insects came to the light. One of the numerous *N. alternatus* attracted to the light seized and fed on an adult mosquito, *Aedes dorsalis* (Meig.) which lit nearby. After approximately twenty seconds the predator began to walk, but predator and mosquito tumbled into the cyanide bottle. A second *alternatus* captured and fed on a small midge for 25 seconds, then discarded it. In a field northwest of Clearfield, Utah, a *Nabis ferus* L. was observed to feed on a small larva of the alfalfa caterpillar, *Eurymus curytheme* (Bdv.), in a shaded edge of an alfalfa field.—G. F. KNOWLTON, Utah State Agricultural College, Logan, Utah.

## BOOK NOTES

**American Spiders.** By Willis J. Gertsch. xiii + 285 pp., 119 photographs including 44 in color, 6 text figures. 6 × 9 ins., cloth bound. 1949. D. Van Nostrand Company, New York, N. Y. (Price, \$6.95)

This is an important contribution to the biological literature, representing as it does one of the few attempts that have been made to bring together in one volume the existing knowledge of the biology of American spiders. In this, the book succeeds very well. It treats of the life histories of the various spider families, the tarantulas, the cribellate spiders, the aerial web spinners, and the hunting spiders. A great deal of attention is given to courtship and mating habits, egg-laying and web-making. One chapter deals largely with the relationship between spiders and the other arachnids, another is devoted to their external structure particularly as it concerns mating and spinning habits. Following the general treatment, which takes up about two-fifths of the book, each major family is discussed in some detail and reference is made to the peculiar habits of various genera and many species. The book closes with a chapter on economic and medical importance of spiders and a chapter dealing with the relationship between American species and other spiders of the world. The book does not deal with the internal anatomy of these animals, nor with their histology, embryology or, to any extent, with their parasitology. The book is not intended as a manual for the identification of spiders, but certainly the naturalist would find it of great value in placing spiders in their proper families. The great value of the book lies in its emphasis on the habits of these interesting creatures, a subject that receives very little attention in the more taxonomic treatments.

The book contains 32 color plates and 32 plates in black and white gravure; almost all are photographs of spiders in their natural habitats. These superb photographs have been contributed by 17 different artists, most of them by Walter Van Riper of the Colorado Museum of Natural History, by Lee Passmore, J. M. Hollister and Richard L. Cassell. Many of these illustrations show the spiders magnified several times greater than natural size. These undoubtedly represent the most extensive collection of North American spider photographs that have ever been published in one place. Although these excellent photographs do a great deal to enhance the value and appearance of the book they seem to have been included largely because they are good pictures of spiders and are of limited usefulness as illustrations in support of the text material.

Indeed, the scientific names accompanying the photographs do not in all cases correspond with the scientific names used for the same species in the text. Furthermore, some species such as *Latrodectus mactans* which appears in twelve of the photographs and *Argiope trifasciata* and *aurantia* which are pictured in nine photographs, seem to have received a disproportionately large amount of attention. However, this mild criticism is of minor importance and is not intended to detract from the great value of these splendid photographs. There are six text figures which help illustrate some of the points not shown in the plates. The color plates in the book have been indicated by Arabic numerals; black and white plates by Roman numerals. There seems to be no advantage in this system and it is definitely confusing to the casual reader, especially when it results in two different plates both being designated Plate 11; i.e., for the eleventh color plate and the second black and white plate.

Gertsch is to be congratulated for his excellent presentation of the subject matter. The text is well-written and very readable and his chapter on the evolution of spiders is particularly stimulating. To this reviewer the book does seem to be rather poorly documented, however. There are only sixteen references in the Bibliography although several additional references have been included as footnotes accompanying the text. One finds himself wondering about the original source of many of the statements the author makes and it is not clear whether the observation is original with the author or has come from some other source. The Glossary also might well have been expanded. It does not help the reader much to learn that the tergites are the dorsal sclerites of the body without a definition of the term sclerite.

The book seems also to be quite unnecessarily repetitive on some points. Thus, there is a tendency to refer to a peculiar habit of a species both in the general treatment early in the book and again in the special treatment of families. The author also makes quite inappropriate use of certain terms in referring to spiders. Thus, a species is given a certain name because of its long *bony* legs, the palpi of males are referred to obsoletely as *tumorous* enlargements, females are spoken of as being *pregnant*, one species is said to be "found in *prairies covered with a sparse growth of low plants.*" *Nephila*, without sufficient explanation, is referred to as our only silk spider although the silk-spinning habits of many other species are described. *Filistata* is spoken of as a *large animal* and regarding the cribellate species, the author says, "the very fact that they

have retained the cribellum, with its glands of sticky silk, indicates their reliance on it in some measure". The same might just as correctly be said of the human appendix. Another misleading statement, referring to the spider's chemical senses, is as follows: "Since the sensation comes to the spider only when in contact with chemical substances, it is nearer that of 'taste' than of 'smell'". Finally, with reference to *Deinopsis*, the author states, "The habits of these spiders . . . would seem to require good night vision, and this doubtless accounts for the development of such large eyes".

These criticisms are, however, insignificant when they are weighed against the excellent features of this remarkable book. Scientists and layman alike will be amazed at Gertsch's account of the tireless activities of the spiders, their ballooning, insect-snaring and other habits. This volume should go a long way toward dispelling many of the popular fallacies which have led them to be regarded with such foolish disdain as is current among the uninformed. High respect for these generally inoffensive and impressive creatures is long overdue. LEONARD G. WORLEY, Manhasset, New York.

**The Insect World of J. Henri Fabre.** Selected, with interpretive comments, by Edwin Way Teale. ix+333 pp., photographic end papers, index. 6 by 9 ins., cloth bound. 1949. Dodd, Mead & Company, New York, N. Y. (Price, \$3.50)

It is not necessary that the reader have a penchant for natural history in order to feel the spell exercised in these pages. From the marvelous writings of Monsieur Fabre on the insect world, Edwin Teale has chosen what he considers the best and most representative examples. In these carefully edited selections, Mr. Teale gives us every nuance and charm of the original essays that lay scattered over the ten volumes of Fabre's classic *Souvenirs Entomologiques*. A world that to most of us is unknown is revealed by Fabre in these intimate disclosures of insect life. Mr. Teale pays fitting and sympathetic tribute to the great French naturalist in the long introduction and his annotations at the beginning of each chapter.

Fabre's delicacy of observation and humor of description may be found in these records of insect psychology, family life and habits in peace and war. His remarkable power of discovering and transmitting his interest in a subject deeply loved by him seems to have been as inexhaustible as the subject itself. The first chapter of this generous volume contains a description of the laboratory

in the open fields which he gained after forty years of wanting and working. To this *harmas* flocked myriads of the tiny creatures Monsieur Fabre wished to study. The succeeding chapters discuss separately dozens of different types of insects, including the praying mantis; the burying-beetles; the spiders; the glow-worm; the cabbage-caterpillar; the hunting wasp. The stories of these insects read like a fairy tale.

Fabre puts the magic of his personality into his study so pervadingly that behind the scientific account of the insect we always see the charming portrait of the man. What one most enjoys in the French savant is the muscled intelligence of the man. He commands respect and communicates pleasure because one's instincts are gratified by the directness and clean simplicity of his mind. One also loves Fabre for his inveterate aversion to the intricate panoply of modern scientific research, but one sees him as the last of his race.

**The Insect World of J. Henri Fabre** is a book in which curiosity, love and story are blended in just proportions. No man has brought to the study of the *living* insect so great patience and insight inspired with such enthusiasm. So new and fascinating is Fabre's method of presenting facts that the scientist and general reader will find it equally interesting. Whatever the explanation of the surpassing grace of Fabre's style, the fact remains that few other entomologists have succeeded in imparting so much human interest to these lowly denizens of field and forest. J. Henri Fabre might have gone on writing another lifetime without wearying the world. CATHERINE JAN ZYMARIS, Brooklyn, New York.

# BULLETIN

OF THE

## BROOKLYN ENTOMOLOGICAL SOCIETY

---

VOL. XLV

APRIL, 1950

No. 2

---

### A NEW SPECIES OF PSEUDOGAURAX FROM FLORIDA (DIPTERA, CHLOROPIDAE).

By CURTIS W. SABROSKY, Washington, D. C.

Up to the present time only two species of the genus *Pseudogaurax* Malloch, the widely recorded *anchora* Loew and *signatus* Coq., have been known from the United States and Canada. The larvae of both species are egg predators, especially in the egg sacs of spiders, *signatus* being commonly reared from the cocoons of the black widow spider. The genus is much better represented in Latin America, where about two dozen species are known.

During a recent trip to the Everglades National Park, the writer collected a new and strikingly distinct species while beating low shrubs back of the beach on Cape Sable, near the southern tip of Florida.

The color pattern and proportions of mesonotum and scutellum are important specific characteristics, and these have been figured (Fig. 1). For similar figures of seven other species of the genus, including the North American *anchora* and *signatus* the reader is referred to Hall (1937, Jour. Wash. Acad. Sci. 27: 255-261).

#### *Pseudogaurax floridensis* n. sp.

*Male, female:* Yellow, only the small ocellar tubercle, short arista, lateral stripes on mesonotum as figured, metapleuron and extreme sides of metanotum, three incomplete stripes on abdomen, and a spot on hind tibia at base of the oval sensory area, black; antenna deep yellow; lower face and cheeks whitish; median mesonotal stripe reddish; mesopleural and sternopleural spots reddish to light brown; abdomen with lateral stripes along segments one through four but absent from five, the median stripe distinct on segments four and five but faint on three and absent anteriorly.

A typical *Pseudogaurax*, with the generic characters cited by

Hall (l.c., p. 257); width of front at vertex approximately three-fourths its own length and .36-.37 times the width of the head; frontal triangle smooth and polished, not pollinose, extending slightly less than three-fifths the length of the front; arista notably short for the genus, only 1.2 times the length of the third antennal segment; proportionate length to width of mesonotum as 28:25, and of scutellum as 11:11, the outline of the latter as viewed from above somewhat rounded, leaving the impression that the scutellum is shorter and more rounded than usual in the genus; marginal cell not conspicuously broadened as is usually the case; second costal sector only slightly longer than the third sector, by about 1.3 times. Length, 2 mm.

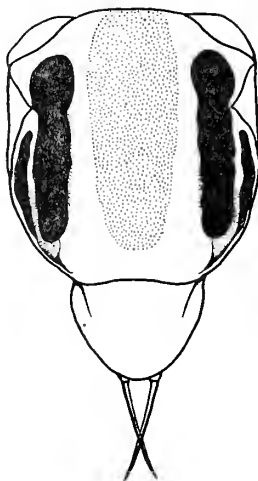


Fig. 1. Mesonotum and scutellum, dorsal aspect, of *Pseudogaurax floridensis* n. sp.

Holotype male, allotype, and nine paratypes (3 males, 6 females), Middle Cape of Cape Sable, Florida, December 18, 1949 (C. W. Sabrosky); two paratypes (male, female), same data (G. S. Walley). Type and allotype deposited in the U. S. National Museum, Type No. 59419, paratypes in the author's collection and the Canadian National Collection, Ottawa.

The color pattern will separate the species from any other known in this hemisphere, particularly from the Nearctic *signatus* and *anchora* which have a median black stripe on the scutellum, the latter also having a distinctive anchor-shaped black spot formed by a broad median mesonotal stripe with lateral extensions anteriorly.



## SYNONYMICAL NOTES ON NORTH AMERICAN SPHECOID WASPS: III<sup>1</sup>. (HYMENOPTERA).

By KARL V. KROMBEIN, Washington, D. C.

### III. THE NEARCTIC SPECIES OF *Diodontus* CURTIS<sup>2</sup>

During the preparation of the section on Psenini for the forthcoming synoptic catalog of North American Hymenoptera, an examination of the types of *Diodontus* in the U. S. National Museum collection and study of the Holarctic material in that and my personal collections have enabled me to reach different conclusions from those expressed by Malloch in his revision.<sup>3</sup> The following notes are offered at this time, since an elaborate treatment will not be possible in the aforementioned catalog.

The Nearctic species are referable to *Diodontus s. str.* Apparently most of the Oriental forms belong to the subgenus *Eopsenulus* Gussakovskij.

#### *Diodontus (Diodontus) frontalis* (Fox).

*Psen frontalis* Fox, 1898. Trans. Amer. Ent. Soc. 25: 4 (♀; Utah, N. Mex.; type in Academy of Natural Sciences, Philadelphia).

*Neofoxia frontalis* (Fox), Viereck, 1901. Trans. Amer. Ent. Soc. 27: 342.

*Diodontus frontalis* (Fox), Malloch, 1933. Proc. U. S. Natl. Mus. 82, Art. 26: 4 (♀, ♂; Colo.).

*Diodontus occidentalis* Malloch, 1933, not Fox, 1892. *Op. cit.*, p. 5 (♀; Tallac Lake, Calif.; type in U. S. National Museum).  
NEW SYNONYMY.

*Diodontus hesperus* Pate, 1944. Canad. Ent. 76: 133 (new name for *occidentalis* Malloch, not Fox). NEW SYNONYMY.

The series of this species before me comprising the unique type of *occidentalis*, the 3 specimens of *frontalis* mentioned by Malloch, and 13 additional specimens from Washington, California and Arizona, show variation in regard to the propodeal sculpture adjacent

<sup>1</sup> Notes I and II were published in this journal, vol. 43: 18-21, 1948.

<sup>2</sup> Not the *Diodontus* of European authors, the species of which are properly referable to *Xylocelia* Rohwer (see Pate, Mem. 9, Amer. Ent. Soc., footnote 69, p. 23, 1937).

<sup>3</sup> Proc. U. S. Natl. Mus. 82, Art. 26: 1-60, 2 pls., 1933.

The first part of the paper is devoted to a general  
 discussion of the problem. It is shown that the  
 problem is of great importance in the theory of  
 functions of a complex variable. The second part  
 contains a detailed proof of the theorem. The third  
 part is devoted to some applications of the theorem.  
 The fourth part contains some remarks and a list of  
 references.



stated in the original description. This incorrect sexing is evident in the original description, for Rohwer refers to the short, stout antennae thickening toward the apex, which is true only in female *Diodontus*, the males having more or less moniliform antennae. However, some time subsequent to the original description Rau sent in two males, and these were the basis for Malloch's interpretation of *corusanigrens*, as is evident from his remarks as to the character of the interantennal prominence. I do not know why Malloch considered these males as part of the type series, as he stated, for neither bears a type label. At any rate, Rohwer's type is conspecific with the type of *sulcatus* Malloch, and is so similar in every essential with the type series of *sulcatus* as to lead me to believe that Malloch may never have actually examined Rohwer's type. Pate has already commented on the identity of *sulcatus* and *trisulcus*.

This species inhabits almost as extensive a range as *atratus parenosas*. However, it has no homologue in the Palaearctic region so far as I can determine. I have seen material from the Eastern States from New Hampshire to Tennessee, and it occurs also in Missouri and Kansas. It has been reared from nests in sumac, elder and pith. Nothing is known as to the prey.

### *Diodontus (Diodontus) alienus* n. sp.

The present form, an anomalous member of the North American fauna, has its closest relative in the Palaearctic *schencki* (Tournier), which de Beaumont records from central and northern Europe. It differs from the other Nearctic species (and agrees with *schencki*) in the female in the absence of apical fringes of long hairs on sternites four and five, the lack of a ridge circumscribing a semi-elliptical depressed area at the base of the second sternite, the presence on the outer surface of the mid tibia at the apex of a longitudinal flattened area margined anteriorly by a short ridge and posteriorly by a row of several short, stout spines, and the feebly emarginate median lobe of the clypeus. The male of *alienus* is unknown. Assuming that it will be very close structurally to *schencki*, it should be readily separable from males of the other Nearctic species by the presence of tyloides on all flagellar segments and lack of a semi-elliptical depressed area at the base of the second sternite.

Although *alienus* is closely related to *schencki*, it appears to be specifically distinct. The complete lack of a transverse facial carina, the narrower interantennal process, the more densely punctate mesopleuron, and the lateral carina on the dorsum of the abdominal

petiole present only on the basal third all serve to distinguish it from *schencki*.

Type: ♀; Camino, Eldorado Co., California; June 27, 1948; (H., M., G., and D. Townes); [Krombein collection]. Placed on loan deposit in the U. S. National Museum.

*Female*. 6.1 mm. long, forewing 4.1 mm. Black; flagellum beneath, fore and mid tibiae beneath, fore and mid tarsi entirely, and narrow annulations at apices of all femora, tibiae and first three segments of hind tarsus pale reddish. Vestiture silvery and glistening, very dense and decumbent on clypeus and supraclypeal area, sparser and more or less erect elsewhere on head and thorax; apical fringes of long hairs lacking on fourth and fifth sternites. Wings hyaline, stigma and nervures fuscous.

Head shining except for clypeus and supraclypeal area; apical margin of clypeus with two small blunt teeth in middle separated by a narrow, shallow emargination, the clypeus and supraclypeal area with dense small punctures; transverse facial carina lacking; longitudinal frontal carina narrowly sulcate from base of supraclypeal area to the interantennal area where the expanded part is shorter and narrower than in *atratus parenosus*; front with moderate punctures which are subcontiguous in middle and sparser towards eyes; postocellar distance slightly greater than ocellocular distance (9:8); vertex punctate, not at all striate; temples striato-punctate.

Thorax shining; mesonotum with moderate punctures which are denser toward sides and anteriorly, without rugulae antero-laterally; mesopleuron with moderate punctures most of which are separated by about the width of a puncture; dorsum of propodeum adjacent to enclosure with fine, close, oblique rugulae, posterior surface striato-punctate on upper two-thirds, lateral surface obliquely rugulose.

Abdomen shining, the petiole with dorsal sulcus and lateral carina present on basal third only; second sternite without a semi-elliptical depressed area at base margined by a rounded ridge; pygidial area very narrow, finely punctate, the width at bases of lateral ridges only one-third the length.

Forewing with third submarginal cell receiving the second recurrent nervure near the base, the cell twice as long on cubital vein as on radial vein.

\*

\*

\*

The following key will be of service in separating the forms of *Diodontus* in North America.

1. Female: transverse facial carina lacking; mid tibia on outer surface at apex with a longitudinal flattened area margined anteriorly by a short ridge and posteriorly by a row of several short, stout spines; apices of sternites four and five without fringes of long hairs; pygidium very narrow, the basal width only one-third the length. Male unknown, but presumably tyloides present on all flagellar segments and second sternite with no trace of a basal depressed, semi-elliptical area.

*alienus*, new species

Transverse facial carina present. Female: mid tibia evenly convex at apex, not modified as above; apices of sternites four and five with fringes of long hair; pygidium broader, the basal width two-thirds or more the length. Male: always with some vestiges of the depressed, semi-elliptical area at base of second sternite which is so strongly developed in the females; tyloides lacking on at least the last two flagellar segments . . . . . 2

2. Broad median sulcus and lateral carina present only on basal third of dorsum of abdominal petiole; interantennal prominence of female very broad, the greatest width always one-half or more the length; antennal tyloides of male small, oval, shining and prominent, present on all flagellar segments except the last two . . . . . *frontalis* (Fox)

Broad median sulcus and lateral carina present on nearly the entire length of the petiole; interantennal prominence of female narrower, the greatest width never as much as half the length; antennal tyloides of male linear, discernible only with difficulty, apparently lacking on the last six flagellar segments . . . . . 3

3. Longitudinal carina on face sulcate to its intersection with the transverse carina (very narrowly so in male); face and vertex punctate only; size larger, females 6.1–7.1 mm. long (avg. 6.4), males 5.6–6.4 mm. (avg. 5.9) . . . . . *trisulcus* (Fox)

Longitudinal carina on face not sulcate for some distance above its intersection with the transverse carina; face and vertex usually noticeably striato-punctate; size smaller, females 4.4–6.1 mm. long (avg. 5.3), males 4.6–6.1 mm. (avg. 5.2).

*atratus parenosas* Pate

NEW OR INSUFFICIENTLY-KNOWN CRANE-  
FLIES FROM THE NEARCTIC REGION  
(DIPTERA, TIPULIDAE).  
PART XII.<sup>1</sup>

By C. P. ALEXANDER, Amherst, Mass.

The preceding part under this general series of papers was published in 1949 (*Bull. Brooklyn Ent. Soc.*, 44: 152-157). At this time I am describing four novelties from the mountains of south-eastern Arizona, collected by my friends Messrs. Owen Bryant, William Nutting and Floyd Werner, to whom I am greatly indebted for the privilege of retaining the types in my personal collection of these flies.

*Tipula* (*Bellardina*) *catalinensis* n. sp.

Mesonotal praescutum buffy gray, with four brown stripes, the median interspace more reddened, the lateral ones clearer gray; scutellum brownish yellow, with a narrow brown central line; antenna with scape and pedicel yellow, flagellum dark brown; femora obscure yellow, the tips narrowly brownish black; wings marbled, brownish yellow, variegated with cream-yellow and sparse darker brown areas; abdominal tergites yellow, vaguely trivittate with pale brown, the outer segments brownish black; male hypopygium with the caudal border of the tergite very shallowly emarginate, with a further more ventral median lobe; ninth sternite with a small lyriform median appendage; outer dististyle a large flattened curved blade; inner dististyle small but complex, the beak slender.

*Male*: Length about 18 mm.; wing 19 mm.; antenna about 3.5 mm.

Frontal prolongation of head obscure brownish yellow, slightly pruinose dorsally; nasus elongate; palpi brown, the incisures restrictedly pale. Antennae relatively short; scape brownish yellow, corrugated; pedicel clearer yellow, flagellum dark brown; flagellar segments subcylindrical or with the basal enlargements feebly indicated; verticils longer than the segments. Head above brownish gray, the sides of the occipital region more yellowed, the vertex with a brown central stripe; vertical tubercle very low.

Pronotal scutum weakly infuscated medially, more yellowed on

---

<sup>1</sup> Contribution from the Department of Entomology, University of Massachusetts.

sides; scutellum and pretergites clearer yellow. Mesonotal praescutum buffy gray with four brown stripes, the median interspace more reddened, slightly broader at and beyond midlength; lateral interspaces clearer gray, the reddish lateral stripes narrowly bordered internally by brown; scutal lobes dark gray, the central area obscure yellow; scutellum brownish yellow, with a narrow brown central line, parascutella brownish testaceous; postnotum gray pruinose, the cephalic half less so. Pleura and pleurotergite pale brown, sparsely pruinose, the propleura and dorsal mesopleura slightly darker to form a weak stripe, the ventral sternopleurite and meron similarly darkened; dorsopleural membrane broadly yellow. Halteres with stem yellow, knobs broken. Legs with the coxae yellow, sparsely pruinose, the bases of the fore pair vaguely darkened; trochanters yellow; femora obscure yellow, the tips narrowly brownish black; tibiae yellowish brown to brown, the tips narrowly more infuscated; tarsi brownish black; claws (male) weakly toothed. Wings marbled, brownish yellow variegated with cream-yellow and sparse darker brown areas; prearcular and costal fields a trifle more yellowed; the darkest markings include the stigma, origin of *Rs*, anterior cord and a spot before midlength of cell *Cu*, the last being preceded and followed by more whitish markings; tips of cells *R*<sub>5</sub> to *M*<sub>3</sub>, inclusive, with pale spots; cell 1st *A* with two larger similar areas; irregular, more cream-yellow markings before and beyond stigma and in cells *R* and *M* at about the level of the origin of *Rs*; veins brown. Venation: *R*<sub>1+2</sub> entire; *Rs* about one-half longer than *m-cu*; petiole of cell *M*<sub>1</sub> and *m* subequal.

Abdominal tergites yellow, vaguely trivittate with pale brown, the central stripe broader and more diffuse, the narrow sublateral stripes barely interrupted at the sutures; lateral tergal borders narrowly light gray; sternites obscure yellow, darkened on sides; outer segments brownish black. Male hypopygium relatively large; ninth tergite separated from the sternite by a virtually entire suture; basistyle and ninth sternite entirely fused. Ninth tergite large, when viewed from above appearing narrowed outwardly, the apex with a very shallow emargination; more ventrally with a small median lobe that is densely provided with blackened spinules, the lobe subtended on either side by a small pale blade. Ninth sternite with a small lyriform median appendage, the arms slender, glabrous. Outer dististyle large, appearing as a flattened gently curved blade, at base on either side with a pale membranous lobe that bears a group of setae; outer end of style more expanded, on the concave lower surface with numerous setae and a small lobule before the



obliquely truncated apex. Inner dististyle small, complex; beak small, slender, the corresponding posterior end of style a trifle larger and stouter but having the same general shape. Eighth sternite unarmed.

*Habitat*: Arizona (Pima County).

*Holotype*: ♂, Santa Catalina Mountains, June 26, 1935 (Owen Bryant).

This interesting crane-fly superficially resembles *Tipula* (*Bellardina*) *gothicana* Alexander and some allied forms, differing from all particularly in the structure of the male hypopygium.

### ***Tipula* (*Eumicrotipula*) *werner* n. sp.**

Belongs to the *glaphyroptera* group; general coloration gray, the praescutum with three darker brown stripes, their anterior ends with four polished black areas, the intermediate pair more extensive; antennal flagellum bicolored; femora obscure yellow, the tips blackened, preceded by a clearer yellow ring; wings whitish subhyaline, patterned with dark and paler brown;  $R_{1+2}$  atrophied; abdomen yellow; ovipositor with the cerci slender, curved gently downwards to the tips.

*Female*: Length about 13 mm.; wing 13 mm.

Frontal prolongation of head polished yellow, narrowly lined with brown on the sides; nasus long and slender; basal two segments of palpi brown, the outer ones black. Antennae with the scape and pedicel yellow, flagellum bicolored, the segments dark brown or brownish black at base, yellow apically, on the more proximal segments the amount of yellow slightly exceeding the black, the outer segments more uniformly darkened. Head above gray, vaguely patterned with a reddish line on either side of the posterior vertex and with a capillary dark brown median vitta; vertical tubercle more yellowed.

Pronotum gray, with three narrow brown markings. Mesonotum light gray, patterned with brown; praescutum with three darker brown stripes, the anterior ends of the lateral pair and the anterolateral parts of the median vitta conspicuously polished black, the latter areas larger; median praescutal stripe narrowed and darker at posterior end; scutum with a central darkening and two isolated brown areas on each lobe; mediotergite with vague indications of an incomplete capillary darkened area. Pleura and pleurotergite light gray; dorsopleural region pale yellow. Halteres with stem yellow, clearer at base, knob dark brown. Legs with the coxae grayish pruinose; trochanters yellow; femora obscure

yellow, the tips blackened, preceded by a clearer yellow ring of about the same width; tibiae brownish yellow, the tips narrowly brownish black; tarsi passing into black. Wings with the ground whitish subhyaline, patterned with darker and lighter brown, the former including much of the prearcular field and the vicinity of arculus and *h*, with three further dark areas in cell *Sc*, the one at outer end smallest; interspaces of cell *Sc* pale yellow; cell *C* medium brown, variegated with pale yellow beyond *h* and again at the outer end; stigma brown; paler brown washes over most of the remaining cells, more expanded and confluent near the wing tip, due to broad marginal seams to the veins; other slightly darker washes across the outer radial field and over the outer ends of cells *R* and *M*; still other pale washes in outer ends of the Anal cells; over most of the surface, the pale ground exceeds the dark color in area; veins chiefly brown. Venation:  $R_{1+2}$  atrophied;  $R_3$  nearly three times  $R_{2+3}$ ; *Rs* more than twice *m-cu*, the latter oblique, placed on *M*, just beyond the origin; cell 2nd *A* relatively narrow.

Abdomen yellow, the outer segments somewhat darker, possibly caused by internal discoloration; caudal margins of segments very narrowly clearer yellow. Ovipositor with the cerci relatively slender, curved gently downward so that the concave edge is the ventral one, instead of the reverse, as common in the genus.

*Habitat*: Arizona (Pima County).

*Holotype*: ♀, Madera Canyon, Santa Rita Mountains, altitude 5,600 feet, August 14, 1949 (Floyd Werner and William Nutting).

I take great pleasure in naming this distinct fly for Mr. Floyd Werner, at this time a graduate student at Harvard University. This is the first member of the *glaphyoptera* group of the subgenus to be found in the United States. The very numerous Neotropical species of the subgenus *Eumicrotipula* Alexander have been discussed by the writer in another paper (Rev. de Entomologia, 17: 172-201; 1946). There are several species in South America having vein  $R_{1+2}$  atrophied, as in the present fly, including *Tipula* (*Eumicrotipula*) *chicana* Alexander, *T. (E.) consonata* Alexander, *T. (E.) efficar* Alexander, *T. (E.) flavidula* Alexander, *T. (E.) fraudulenta* Alexander, and others, all being quite distinct in the coloration of the body, legs and wings, and in the structure of the ovipositor. A conformation of the cerci such as occurs in the present fly is very uncommon in the entire family Tipulidae.

Wings fully developed (*damula*) or greatly reduced (*vestigipennis*) when present with *Sc* unusually short,  $Sc_1$  ending far before the fork of *Rs*; tips of outer radial veins gently upturned,  $R_3$

Genus **Dactylolabis** Osten Sacken.  
Subgenus **Eudactylolabis** n. subgen.

more strongly so. Male hypopygium with two dististyles, the outer a long pale blade; inner style unequally bifid, the lower arm a powerful blackened club, its surface with abundant erect spinous setae, the upper or inner arm a pale lobe lying in the space between the two major styles. Ovipositor with the basal shield elongate, dark brown; cerci very large, forming a dorsal sheath for the hypovalvae, fused basally, the separate tips short and divergent; on lower outer margin of each cercus with a second broader acute tooth. In the elongated concave lower surface of the cerci lie the pale, densely hairy hypovalvae, their tips obtuse.

Type of subgenus: *Dactylolabis damula* (Osten Sacken). The new species herewith described as *Dactylolabis (Eudactylolabis) vestigipennis* likewise belongs here. The group seems to be characteristic of the semiarid regions of the southwestern United States and it seems probable that still further species will be discovered here. Osten Sacken (*Western Diptera*, Bull. U. S. Geol. Survey, 3: 202; 1877) has described the very peculiar ovipositor, stating that "it differs from that of any Tipulid I know of."

**Dactylolabis (Eudactylolabis) vestigipennis** n. sp.

General coloration light gray; wings and halteres very reduced; male hypopygium with the lower arm of the inner dististyle unusually stout, its surface with abundant short spinous setae.

*Male*: Length about 6 mm.; wing 0.85 mm.

The above measurements are those of the paratype specimen; the holotype is larger but is not sufficiently well preserved to add to these measurements.

Rostrum gray pruinose; palpi brownish black. Antennae with the scape and pedicel brown, sparsely pruinose; flagellum dark brown, the segments oval, becoming more elongate outwardly; verticils short, subspinous, placed at near midlength of the segments. Head clear light gray.

Thoracic dorsum chiefly light gray, the praescutum vaguely patterned with darker; pleura clearer gray. Halteres very small, shorter than the wings, entirely pale. Legs with the elongate coxae pale brown, sparsely pruinose; trochanters obscure yellow; remainder of legs light brown, the outer tarsal segments a little darker; tibial spurs distinct. Wings greatly reduced, as shown by the measurements, whitened, only the costal border a trifle darker, provided with dark setae. Venation entirely atrophied.

Abdominal tergites conspicuously patterned, dark gray, with a submedian pair of broken dark brown stripes, the median space clearer silvery gray, the dark stripes narrowly interrupted by the pale caudal borders of the segments; basal sternites more uniformly brown, the outer segments and hypopygium obscure brownish yellow. Male hypopygium with the tergal region thickened, provided with abundant setae that are directed chiefly caudad. Interbases with proximal ends stout, the long apical blades directed mesad. Outer dististyle a long narrow pale blade, setiferous on about the proximal third. Inner dististyle with the lower arm unusually stout, blackened, the tip obtuse, the entire outer surface with abundant short spinous setae that are erect or retrorse, those nearer base longer and more slender; upper or axillary arm a pale flattened blade, provided with scattered setae. Phallosome complex, the terminal element a slender acute spine.

*Habitat*: Arizona (Pima County).

*Holotype*: ♂, Tucson Mountains, altitude 4,500 feet, February 21, 1937 (Owen Bryant). *Paratopotype*: ♂, altitude 4,000 feet, March 4, 1937 (Owen Bryant).

I am indebted to Mr. Bryant for further data concerning these flies and their habitat. The type was found on the under side of a stick, the paratype beneath stones. With the latter it was indicated that two specimens were taken but one of these was apparently lost or mislaid. Bryant stresses the fact that the Tucson Mountains, lying to the west of Tucson, are entirely different from the Santa Catalinas, lying to the east. These mountains are lower and dryer and it is very difficult to find insect specimens thereon except under stones and the like. It is indicated that the range probably has an endemic fauna that appears only in February and March, following the February rains. Bryant further states that the insect fauna hides beneath stones and fragments of wood during the day and is active at night. It is to be hoped that more material of this unusually interesting fly may be found in the future.

### *Rhabdomastix (Rhabdomastix) nuttingi* n. sp.

General coloration gray, the abdomen, including the hypopygium, dark brown; antennae of male approximately four times the length of the body; wings with a weak grayish tinge, the stigma pale brown; veins virtually glabrous;  $Sc_1$  ending approximately opposite four-fifths the length of  $R_s$ .

*Male*: Length about 6 mm.; wing 6.3 mm.; antenna about 24 mm.

Rostrum short, brown; palpi black. Antennae (male) very long,

about four times the body; scape dark brown, greatly enlarged, pedicel very small; flagellum yellow, the outer segments passing into brown, the segments progressively lengthened and more slender outwardly, beyond the first glabrous. Head above dark gray, with three orange yellow spots, a median one behind the antennal bases, the others adjoining the eyes at the narrowest point of the vertex; anterior vertex very broad.

Pronotum gray, the pretergites pale yellow. Mesonotum gray, the stripes not or scarcely differentiated; pseudosutural foveae and tuberculate pits black, the latter large. Pleura gray, the dorso-pleural membrane dusky. Halteres pale throughout. Legs with the coxae testaceous, the fore pair darker; trochanters elongate, yellow; remainder of legs generally light brown, the femoral bases more yellowed, the tips of femora and tibiae narrowly and vaguely darker; outer tarsal segments infuscated. Wings with a weak grayish tinge, the prearcular and costal fields a trifle more yellowed; stigma oval, pale brown; veins brown, more yellowed at wing base. Veins behind costa virtually glabrous, lacking on *R* and its branches, with the exception of a few unusually small trichia at outer ends of veins  $R_5$  and  $M_{1+2}$ . Venation:  $Sc$  relatively long,  $Sc_1$  ending about opposite four-fifths the length of  $Rs$ ,  $Sc_2$  not far from its tip,  $Sc_1$  alone about one-half *r-m*;  $R_2$  suboblique, a little shorter than the distance on costa between the tips of veins  $R_{1+2}$  and  $R_3$ ; *m* long, transverse; outer section of vein  $M_{1+2}$  not conspicuously arched at origin, as in many allied species; vein 2nd *A* strongly sinuous, the cell broad.

Abdomen, including hypopygium, dark brown.

*Habitat*: Arizona (Santa Cruz County).

*Holotype*: ♂, Bear Valley, Tumacacori Mountains, at light, August 22, 1949 (Floyd Werner and William Nutting).

This interesting addition to the United States fauna is named for Mr. William Nutting, to whom I express my appreciation for various Western North American Tipulidae. This is the first record of any species of the typical subgenus *Rhabdomastix* Skuse from north of Mexico. The distribution of the relatively numerous species is chiefly antipodal, with a small number of species occurring north of the equator in both the New and the Old Worlds. The most northerly American species to this date were various ones in southern Mexico, including *Rhabdomastix* (*Rhabdomastix*) *isabella* Alexander, *R. (R.) longiterebrata* Alexander, and *R. (R.) mexicana* Alexander, all of which differ from the present species and among themselves in the details of venation and trichiation of the wings and in features of size and coloration.

THE MICROTRICHIAE OF ANOPHELES  
ALBIMANUS WIEDEMANN.

By G. S. TULLOCH and J. E. SHAPIRO, Brooklyn, N. Y.

In 1944<sup>1</sup> Richards reported some incidental observations on the nature of the microtrichiae of *Anopheles quadrimaculatus* Say, which were based on material examined with the electron microscope. It was noted that these microtrichiae were tapering structures characterized by a ringed appearance due to circular thickenings around the shaft. The purpose of this communication is to record the presence of another type of microtrichia from *Anopheles albimanus* Wied.

The transparency of the wing of *A. albimanus* to 50 kilovolt electrons permits the direct examination of the microtrichiae although for the finer detail of the shaft more satisfactory results may be obtained by tearing the wing membrane and examining these microtrichiae which extend into the unimpeded electron beam. Two types of microtrichiae may be recognized: one is a tapering form similar to that noted in *A. quadrimaculatus* and the other is a bulbous form which is described here. A bulbed microtrichia (Fig. 1)

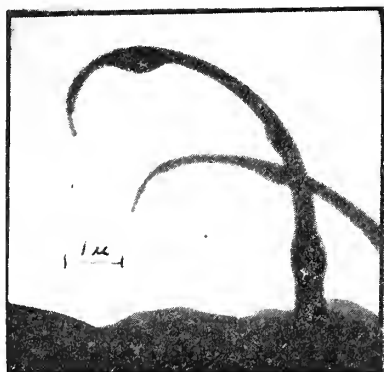


Fig. 1. Electron micrograph of microtrichiae of *A. albimanus*.

is about 9 microns long and except for the enlargements tapers from 0.56 microns at the base to 0.09 at the rounded tip. In side view the basal bulb is bilateral while the remaining two are unilateral. The distal two thirds of the greater curvature of the shaft is constricted at intervals of about 0.126 microns. These constrictions extend at

<sup>1</sup> Entomological News, Vol. LV, No. 10, pp. 260-262.

nearly right angles around the major portion of the shaft but do not reach the margin along the lesser curvature. The maximum number of enlargements on the bulbed microtrichiae appears to be three. In those cases where fewer are noted, the apparent decrease may be due to a reduction in the size of one of the bulbs such that its diameter approximates that of the shaft in that particular area (see lower microtrichia in Figure 1). There appears to be a correlation between the number and size of the bulbs and the curvature of the shaft.

---

**Some Western Tortoise Beetles:** Recently Dr. Milton W. Sanderson checked over the tortoise beetles from the Utah State Agricultural College insect collection, finding the following to be present:

*Deloyala guttata* Oliv. was the commonest species. Utah localities included Hyrum, June 22, 1938 (W. P. Nye-D. E. Hardy); Logan (Knowlton-J. R. Fowler); Providence (R. L. Janes); Ogden (W. D. Fronk, D. R. Maddock). This also was taken at Mesquite, Nevada, May 6, 1943 (Knowlton-W. E. Peay).

*Plagiometriona clavata diversicollis* Schffr. Thatcher, Arizona, September 6, 1947 (E. J. Taylor).

*Jonthonota nigripes* Oliv. Fort Worth, Texas, June 11, 1948 (W. B. Lattimore).

*Metriona purpurata* Boh. Riverdale, Utah, July 10, 1937 (Knowlton); Spanish Fork, Utah, May 20, 1941 (R. S. Roberts); Logan, Utah (R. L. Rigby); Hyrum (Nye-Hardy); and Sunset, Utah, May 14, 1937 (Knowlton).

*M. bicolor* Fab. Collinston, Utah, June 15, 1937 (C. F. Smith); Logan, Utah, July 30, 1942 (Knowlton); Davis California, June 30, 1939 (Knowlton); Guysserville, California, June 23, 1939 (Knowlton); and Ft. Worth, Texas, August 8, 1947 (Lattimore). G. F. KNOWLTON, Logan, Utah.

A NEW SPECIES AND NEW VARIETY IN THE  
GENUS *Priochilus* BANKS (HYMENOPTERA:  
PSAMMOCHARIDAE) WITH A KEY TO  
THE SPECIES OF NORTH AMERICA  
AND THE ANTILLES.

By R. R. DREISBACH, Midland, Michigan.

The genus *Priochilus* belongs in the subfamily Cryptocheilinae and is tropical or subtropical, as there are no species known to inhabit the continental United States.

Mr. Banks placed *Salius opacifrons* Fox in this genus and made it the genotype. He also placed *Pompilus divisus* Smith, *P. regius* Fab., *P. scrupulus* Fox and *P. sericeifrons* Fox in the same genus and stated that there were other species from South America that would go in the genus. He erected the subgenus *Foximia* to include those species that were almost bare of hair and which have no upright hair on the propodeum, only a few hairs on front coxae, and the stigma longer than in the *Priochilus*. Dr. Bradley, in his paper, questions the position of this genus in the subfamily Cryptocheilinae and rather seems to think it might belong to the Psammocharinae, in view of certain characters common to that subfamily. Dr. Bradley bases his opinion on the fact that there is no transverse sulcus on the second ventrite, although he says there is an indication of one, and also the fact that there are tiny pits on the dorsal surface of the last two femora, although the absence of a pocket in the third discoidal cell and a few spines on the posterior tibiae ally it with the Cryptocheilinae.

In the writer's opinion this genus belongs in the Cryptocheilinae without any doubt and the new species here described makes this more certain, since they have definitely a transverse sulcus on the second ventrite, although not as strong as in other genera. The reasons for locating this genus here are the following additional facts: absence of a pocket in the third discoidal cell, the ridge on posterior surface of last tibiae with small teeth (typical of Cryptocheilinae), the cleft claws in the female (which are never cleft in the Psammocharinae in the female), and the character of the pronotum which is very short, with a small transverse ridge about the middle, as well as the before mentioned transverse sulcus on second ventrite. Mr. Banks in his description of the genus says there is no sulcus, and in some of the species it is almost absent.

The following characters summarize the characters of this genus.



First abdominal segment, while hardly petiolate yet has that indication, as it is considerably smaller at base than at apex, expanding, with the sides straight; second ventrite in some species clearly with a transverse sulcus at basal half or third; hind tibiae with a narrow dorsal ridge which has faint teeth, and longer spines on the sides; a row of spines on the middle of ventral surface of last joint of all tarsi, but without spines on the sides; claws of all the legs cleft in female, the outer ray narrow and sharp at point, the inner ray slightly shorter and two or three times as wide as the outer ray, with its tip blunt, obliquely truncate, while in the male the claw of the last leg is not cleft but with a tooth; labial palpi slender; first joint of antenna large, antenna located well above clypeus, long and slender, smaller at apex; no pocket in third discoidal cell, marginal cell very long and very narrow; third cubital cell wide open on the marginal vein; wings either banded over the basal veins and the cubital cells or very dark colored; eyes slightly closer to each other on vertex than at base of clypeus, large and with posterior orbits very narrow; when seen from the side, no part of vertex or ocellar triangle shows above surface of eyes; when seen from in front, the ocellar triangle shows up above the surface as the space between it and the eyes is slightly sunken below eye level; pronotum very short, with hardly any dorsal surface, and a slight depression in center; mesonotum very short, about equal in length to the scutellum and postscutellum together, very hairy except the species of the subgenus *Foximia*; most of the species with sericeous markings over the body making these insects some of the most beautiful of the family; males with bristly tarsi and usually with the last ventrite long and very slender. The only species recorded from this faunal region are *P. opacifrons* (Fox), *P. admirationis* (Cameron), and *P. gloriosus* (Cresson). In studying this genus as represented in the collections of the Museum of Comparative Zoology at Harvard and at the University of Michigan, the following new species and a new variety and six other species were found.

***Priochilus formosus* var. *hondurensis* n. var.**

Holotype female: head, thorax, and legs black, abdomen entirely red; with a few upright hairs on clypeus, mentum, and mandibles and several on mesonotum, the rest of head and thorax absolutely devoid of hair; a few long hairs and fore coxae and on the inner tips of all coxae; first three and one half tergites absolutely devoid of hair and shining, with a very few hairs in one spot on sides of two species; the posterior half of tergites four and five and all of six,

with long yellowish, upright, backward-projecting hair; a few long hairs on first four ventrites, but five and six with more numerous ones; when seen from the side, the clypeus is practically flat, eyes extending from basal third of clypeus to top of vertex, with no part of the front above eye surface, eyes broad, posterior orbits very narrow, hardly one fourth as wide as eyes; clypeus truncate in front, with a wide smooth edge, longest at middle and sloping each side to eyes where it is shortest; eyes parallel for the apical three fourths, but sloping toward each other just before they reach the vertex where they are about four fifths as far apart as at the clypeus; when seen from in front, the ocellar triangle stands out above the sides which are slightly concave and are below the surface of the eyes; ocelli large, fore ocellus three fourths its diameter from the laterals, and these as far apart as their distance to the eye margin; a line from fore ocellus to antennal fossae; basal joint of antennae very large, slightly wedge shaped from front to back with the narrow edge in front, and much longer from front to back than wide; first joint hardly one half as long as third joint but about seven times as long as second which is very small, the fourth joint as long as first and ultimate joint four fifths as long as first, the ratio of lengths of these joints is 15:2:30:15:12; antennae situated slightly less than width, of basal joint above clypeus; pronotum strongly angulate behind very short with hardly any dorsal surface, with a slight sulcus in middle and with the anterior half forming a slight transverse ridge, higher than the posterior half; mesonotum slightly rounded in middle, short, about as long as scutellum and post-scutellum combined, both the latter dome shaped; propodeum one and one half times as long as mesonotum, with an evident sulcus its full length; propodeum with more than three fourths of its length as dorsal surface, but sloping slightly its whole length, more strongly so at apical fourth; wings infusate all over but more strongly so at location of bands over the basal veins and the cubital cells; second and third cubital cells of about equal width and length, the third intercubital vein curving outward at apical half so that the third cubital cell is about two times as long on cubitus as on the marginal vein; marginal cell very long, twice as long as its distance to wing tip and very narrow, five times as long as wide; first recurrent vein meets the second cubital cell at apical third and the second recurrent meets the third cubital cell at basal fifth; basal vein in fore wings slightly basad of the transverse vein; in rear wings the cubitus is considerably basad of the subdiscoidal vein; first abdominal segment with an indication of a petiole, with the sides straight; a slight groove at the

basal fourth of second ventrite; no spines on fore and hind femora but a few tiny ones on the dorsal surface of the middle one just before the tip; fore and middle tibiae well spined with several rows around the joint, the third pair of tibiae with a small ridge on the dorsal surface with very fine teeth, with two rows of longer spines on outer surface and with much smaller ones on inner surface; all the tibiae with a bunch of long spines at dorsal tip, but extending around the sides a short distance, these spines at tip becoming decreasingly smaller from first to last pair of tibiae; tarsi well spined, the tarsi of first pair lost; the last two pair of tarsi with a row of long spines in middle of ventral surface of last joint, and presumably the first pair similar since this is true of the other species of the genus; claws cleft, the outer ray slightly longer than the inner and sharply pointed and narrow, the inner ray at least two to three times as broad as the outer one and the tip blunt, obliquely truncate, and as above the fore pair presumably have cleft claws as the other species of the genus, third joint of posterior tarsi not quite twice as long as the last two joints which are subequal; longer spur of posterior tibiae as long as its metatarsal joint.

Length: Head 2.6 mm, thorax 5.4 mm, abdomen 8.6 mm, fore wing 11.9 mm, rear wing 8.6 mm.

This species is typical of the genus, by virtue of its hairy, large basal joint of the antenna, which is situated well above clypeus, spines in middle of ventral surface of the last tarsal joint, cleft claws, short pronotum, first segment of abdomen slightly petiolate, with straight sides, and slight groove on second ventrite.

Banks considered this specimen very close to *formosus*, but noted that it was not the same species. It differs in having the base of abdomen with only the faintest trace of black, whereas *formosus* has a definite black base, and in the color of wings which do not have a cloud over the cubital and marginal cells as in *formosus*, but the wing is of an even deep brown color throughout.

Holotype female: Lancetilla, Honduras, X-31-32, Stademann (MCZ).

### ***Priochilus hinei* n. sp.**

Holotype female: completely black, except for slight silvery pubescence on sides of tergites two and three, ventrites two and three, a spot just above the base of middle coxae, dorsal and ventral surfaces of coxae, and on the middle of mesosternum; when seen from the side, the clypeus slightly arched, eyes extending from base of clypeus to top of vertex, a slight length of clypeus below the tips of eyes;

eyes broad, posterior orbits almost invisible and the front at antennal fossae just visible above the eyes; clypeus truncate with a broad smooth edge in front; ocellar triangle just barely above the vertex, when seen from in front, the surface between eyes and ocellar triangle slightly below eye level; anterior ocellus its diameter from the laterals, and these one half as far apart as their distance to eye margin; a line extending just about half way from antennal fossae to the fore ocellus; eyes closer together on vertex than at base of clypeus; antennae placed well above clypeus; first joint of antenna, large, broad and flat in front; first four antennal joints with the ratio of their length as 50:20:80:60; pronotum very short with hardly any dorsal surface and a slight emargination in the center; mesonotum about equal in length to the scutellum and post-scutellum; propodeum with about three fourths of its length as dorsal surface, with a small silvery spot at posterior outer corners, and with a slight sulcus its full length; abdomen chunky, second ventrite with a slight transverse groove at basal third; apices of fourth and fifth tergites and all of the sixth with long hairs, these rather stiff and with the appearance of the genus *Anoplius*, the pygidial surface with finer pubescence under the stiff hairs; a few long scattered hairs over ventral surface of abdomen but the most on the last ventrite; only a few long hairs on vertex and clypeus, but more numerous ones on mentum and mandibles, no long hairs on thorax except for a very few on mesonotum; fore wings with two strong bands, one starting at basal veins and covering one third of length of first discoidal cell, and three fourths of the second discoidal cell, the other band covering the marginal cell, apex of the first and all of the second and third cubital cells and outer half of the third discoidal cell, the rest of wing slightly brownish; first recurrent vein meets the second cubital cell slightly beyond the middle, the second recurrent meets the third cubital cell at the basal third; basal vein basad of the transverse vein in fore wings and the cubitus and subdiscoidal veins in rear wing almost interstitial; no spines on femora and only three small ones on the ventral surface of fore tibiae, but four fairly long ones on dorsal apex of fore tibiae; second and third pair of tibiae well spined, the third pair with a ridge on dorsal surface which has fine teeth with longer spines on the side; last two pair of metatarsal joints more heavily spined than the first; a row of spines in middle of ventral surface of the last tarsal joint, with none on the sides; third and fifth joint of fore tarsi about equal in length, twice as long as the fourth; third joint of posterior tarsi longer than the fifth, which is slightly longer than the fourth; all claws cleft about as in preceding species.

Length: Head 1.35 mm, thorax 4.3 mm, abdomen 4.6 (partly telescoped), fore wing 8.6 mm, rear wing 7.0 mm.

Holotype female: Los Amates, Guatemala, III-18-05, Jas. S. Hine (MCZ).

### **Priochilus Banks.**

*Priochilus* Banks, Psyche, L, 1943, p. 82. (o.d. Genotype—*Pompilus nobilis* Fabricius)

*Priochilus* Banks, Bull. Mus. Comp. Zool., XCIV, 1944, p. 18.

*Priochilus* Bradley, Notulae Naturae, Acad. Nat. Sci., Phila., 145, 1944, p. 5. (desc. questions position in *Cryptocheilinae*)

*Foximia* Banks, Bull. Mus. Comp. Zool., XCVI, 1946, p. 510. (new subgenus of *Priochilus*)

### **Priochilus admirationis (Cameron).**

*Pompilus admirationis* Cameron Biol. Centr. -Amer. Hymen., II, 1893, p. 111. Female. (o.d. Panama. Type?)

This species as noted above was described in the female only. From its description this species should belong in this genus, as the claws are given as partly cleft, which is characteristic of only one other genus in this subfamily, the marginal cell as long and narrow, the third cubital cell as widely open on the marginal vein, the recurrent veins meeting their respective cells as is usual with the genus, the propodeum with a sulcus on the apical half, and the apical tergite with long hair as in the other species. The posterior femora and coxae are noted as red in color, the wings fuscus, violaceous.

### **Priochilus amabilis Banks.**

*Priochilus (Foximia) amabilis* Banks, Bull. Mus. Comp. Zool., XCVI, 1946, p. 515. Male, female (o.d. Ecuador. MCZ)

There is one female in the University of Michigan collection, collected by Dr. T. H. Hubbell, in Honduras. I have not seen the male. Front legs all black, the coxae and femora of the last two pair of legs red, except the tips of femora; no trace of silver on body; small spines on the last tibiae; basal vein slightly basad of the transverse vein in the fore wings and the subdiscoidal in rear wings far beyond the cubitus; the first recurrent vein received by the second cubital cell beyond the middle, and the second recurrent is received by the third cubital cell at the basal fourth; no comb spines on fore legs as is true of rest of species; eyes closer together at vertex than at the clypeus; fore ocellus one half its diameter from the laterals and these about as far apart as their distance to eye margin; no

striations on propodeum. *Admirationis* has only the posterior femora and coxae red, while this species has these parts red on the last two pair; the basal vein in this species is basad on the transverse, while in *admirationis* it is interstitial with the transverse.

***Priochilus gloriosus* (Cresson).**

*Pompilus gloriosus* Cresson, Proc. Boston Soc. Nat. Hist., 12, 1869, p. 368. Female. (o.d. Mexico. Amer. Ent. Soc.)

*Pompilus gloriosus* Cameron, Biol. Centr.—Amer. Hymen., 2, 1893, p. 201. Female. (Guatemala, Panama)

*Priochilus gloriosus* Bradley, Notulae Naturae, Acad. Nat. Sci. Phila., 145, 1944, p. 6.

This is a very beautiful species with brilliant silvery pubescence and bimaculate wings. Wings banded with a broad band over the basal veins, and one over the cubital cells, the rest of the wing hyaline; beautiful silvery pubescence on the sides of tergites, two and three, on the face, posterior orbits, a band above the middle coxae, all the coxae, sides of pronotum and both base and apex of propodeum; small spines on last tibiae; third cubital cell longer than the second cubital, about as long on the marginal vein as on the cubitus; first recurrent vein meets the second cubital cell at apical third; the second recurrent vein meets the third cubital cell at basal fourth; basal vein interstitial with the transverse vein in fore wings, and in the rear wings the subdiscoidal vein is slightly beyond the cubitus; first antennal joint is silvery and smaller than third, only about one third as long as the third joint; no striations on the propodeum; a dorsal sulcus on propodeum. The basal band of wings ends just about at the veins basally and extends outward toward the wing tip, this band is farther from base of wing than in most of the other species.

***Priochilus nobilis* (Fabricius).**

*Sphex nobilis* Fabricius, Mant. insect, I, 1787, p. 277, no. 59. (o.d.)

*Sphex nobilis* Gmelin, in Linne Syst. Nat. ed., 13<sup>a</sup>, I, 1790, p. 2733, no. 79.

*Sphex nobilis* Fabricius, Entom. System, II, 1793, p. 218, no. 85.

*Pompilus nobilis* Fabricius, Syst. Piez., 1804, p. 199, no. 58.

*Pompilus nobilis* Lepeletier, Encyl. method Insect, 1825, p. 175, no. 5. Female.

*Pompilus nobilis* Dahlbom, Hymen. Europ., I, 1843, p. 47. Male.

*Agenia nobilis* Dahlbom, Hymen. Europ., I, 1845, p. 454, no. 1. Male.

*Anoplius nobilis* Lepeletier, Hist. Nat. Insect, Hymen., III, 1845, p. 449, no. 12. Female.

*Pseudagenia nobilis* Kohl, Verh. zool. bot. Ges. Wien, XXXIV, 1884, p. 42.

One female is in the MCZ collection from Rio Punte in the Antilles. This species can be separated from all other species of the genus, except *sericeifrons* (Fox) by the transversely striated propodeum, and from all others by the large silvery spots on tergites two and three. It can also be distinguished from *sericeifrons* by the fact that the basal half of the propodeum is transversely striated, while in *sericeifrons* the apical half is striated, and by the beautiful golden pubescence on the head and yellow under side of antennae of *sericeifrons*. The wings are banded. Banks lists *Pompilus cosmoptyx* and *P. multifasciatus* as synonyms of this species.

#### **Priochilus opacifrons** (Fox).

*Pompilus opacifrons* Fox, Trans. Amer. Ent. Soc., XVIII, 1891, p. 340. Female. (o.d. Jamaica. Amer. Ent. Soc.)

*Priochilus* (*Foximia*) *opacifrons* Banks, Bull. Mus. Comp. Zool., XCVI, 1946, pp. 512, 518. (key. S.A.)

This species is known in the female only. There is no silvery pubescence on body, and the wings are fumose all over in addition to the bands. This species is the smallest of the genus, size as given in key.

#### **Priochilus regius** (Fabricius).

*Pompilus regius* Fabricius, Syst. Piez., 1804, p. 199, no. 59. (o.d. Amer. mer. Type?)

*Anoplius regius* Lepeletier, Hist. Nat. Insect, Hymen, III, 1845, p. 450, no. 14.

*Pompilus regius* Taschenberg, Zeitschr. f. d. ges. Naturw., XXXIV, p. 67. Female.

*Priochilus regius* Banks, Bull. Mus. Comp. Zool., XCVI, 1946, pp. 510, 512, 514. Male, female. (key. S. A.)

One female in the University of Michigan Collection from Progreso, Chiriqui Prov., Panama, IV-21-23, F. M. Gaige. This is a beautiful species by virtue of the brilliant silvery pubescence on the propodeum (almost as if the segment were white), sides of thorax, clypeus, face, front, and abdominal tergites two and three. Fore wings are deep black, the rear wings are hyaline at base but brown on apical half or more. It is separated from all other species but *rhomboides* by the absence of bands on the wings and from *rhomboides* by the silvery pubescence.

**Priochilus rhomboideus** (Fox).

*Pompilus rhomboideus* Fox, Phila., Acad. 1897, p. 250. (o.d. Brazil. Amer. Ent.)

*Priochilus rhomboideus* Banks, Bull. Mus. Comp. Zool., XCVI, 1946, pp. 511, 513, 514. Male, female. (key. S. A.)

There is one female in the MCZ collection from Flamenco, an island in the Antilles. As noted in the preceding species this is distinguished from all other species but that one by the absence of bands on the wings and from that species by the absence of the silvery pubescence.

**Priochilus sericeifrons** (Fox).

*Pompilus sericeifrons* Fox, Phila. Acad., 1897, p. 251. (o.d. Brazil. Amer. Ent. Soc.)

*Priochilus (Foximia) sericeifrons* Banks, Bull. Mus. Comp. Zool., XCVI, 1946, pp. 512, 519. Female. (key. syn. *Pompilus harperi* Cameron. S. A.)

This species is known from the female only. The wings are banded. It is distinguished from all others by the beautiful golden pubescence on the head, the yellowish ventral surface of the antennae, and the transverse striations on the apical half of the propodeum.

KEY TO THE NORTH AMERICAN AND ANTILLIAN SPECIES OF  
GENUS *PRIOCHILUS* BANKS

1. Wings banded. . . . . 2  
Wings not banded. . . . . 7
2. Vertex, head, clypeus, and front covered with golden, sericeous pubescence; under sides of third and fourth antennal segments with an elongate yellow spot, the under side of the rest all yellowish; sides of thorax silvery; apical half of propodeum transversely striated. . . . . *seariceifrons* (Fox)  
Head without any golden pubescence in reflected light. . . . . 3
3. Dorsal half of propodeum transversely striated; abdominal tergites two and three and often with some of the following ones, with large spots which are silvery in reflected light, similar to species of the genus *Tachytes*; face posterior edge of pronotum, and thorax on sides, silvery; large size; Rio Punte. . . . . *nobilus* (Fabricius)  
Propodeum not striated, and otherwise not as above. . . . . 4
4. Abdomen entirely red, no silvery pubescence. Honduras  
*fumosus hondurensis* n. var.



- Abdomen not red, black. . . . . 5
5. Silvery pubescence on tergites two and three, face, posterior orbits, all the coxae, a band above the middle coxae, sides pronotum, and the base and apex of propodeum; first antennal joint also silvery; fore wings with two broad bands, the rest of wing hyaline; basal and transverse veins interstitial in fore wings; first joint of antennae only about one third as long as the third joint. . . . . *gloriosus* (Cresson)
- Very little or no silvery pubescence and wings at least slightly brownish where the bands do not cover them. . . . . 6
6. Silvery pubescence on sides of tergite three and a spot just above the middle coxae, and on the coxae; wings slightly brownish all over; size, length 10.25 mm, fore wing 8.6 mm. Guatemala . . . . . *hinei* n. sp.
- No silvery pubescence any place on body; pronotum strongly angulate; wings fumose all over where not covered by bands; size very small, not over 7.5 mm, fore wings 6.6 mm. . . . . *opacifrons* (Fox)
7. At least some of the femora and coxae reddish. . . . . 8
- All the legs black. . . . . 9
8. Posterior femora and coxae red, rest of legs black; basal vein interstitial with the transverse vein in fore wings; wings fuscus, violaceous. . . . . *admirationis* (Cameron)
- The last two pair of coxae and femora red, except the tips of femora, and the first pair of femora may be red; basal vein basad of the transverse vein in fore wings and the subdiscoidal is far beyond the cubitus in rear wings.
- . . . . . *amabilis* (Banks)
9. Wings black; beautiful silvery spots on second and third tergites, propodeum, sides of thorax, and clypeus.
- . . . . . *regius* (Fabricius)
- Wings black; no silver whatever, but with some areas slightly lighter than others. Flamenco Island.
- . . . . . *rhomboidcus* (Fox)
- Literature references are as given in the synonymy of each species.

## A PRELIMINARY LIST OF COLLEMBOLA OF UTAH.

By D. L. WRAY,<sup>1</sup> Raleigh, N. C., G. F. KNOWLTON<sup>2</sup> and  
S. C. MA, Logan, Utah.

This study was undertaken because of the lack of information on Collembola occurring in Utah, the opportunity it afforded to learn something of the ecology of these interesting insects, and the fact that some of the species are of economic importance. Also this will help add to our information on the range of Collembola for this section of the United States. More than 250 field samples of leaves, bark, grass, soil, etc., have been collected and the Collembola thus obtained identified by D. L. Wray. Most of the specimens were secured by means of a modified Berlese funnel. From a few to many species were present in most samples of leaf mould examined. Unless otherwise indicated, collections were made by G. F. Knowlton and Shih Chun Ma, in Utah during the years 1947, 1948, and 1949.

### ORDER COLLEMBOLA LUBBOCK

#### FAMILY PODURIDAE LUBBOCK

*Podura aquatica* L. Wellsville, May 18, R. S. Bailey.

*Achorutes maturus* Folsom. Logan, Dec. 15, among moldy boxelder leaves; Hyde Park, March 19, among moldy Lombardy poplar leaves; Smithfield, March 19, under bark of dead poplar; Logan, April 22, among cattle litter and grass; Woodscross, March 28, among moldy grass and willow leaves; Cove, April 9, among a thick layer of poplar leaves, on the ground; Odgen, March 13, among grass and weeds on the ground; Randolph, April 20, among cottonwoods and shrub leaves beneath bushes; Millville, April 26, among layers of wet and moldy leaves.

*Achorutes armatus* Nicolet. Logan, August 31, among boxelder leaves; Woodscross, March 25, among moldy grasses and willow leaves; Smithfield, April 18, from fragments of a rotted post; Randolph, April 20, among cottonwood and shrub leaves on the ground.

---

<sup>1</sup> Entomologist, Div. of Entomology, Dept. of Agri., Raleigh, N. C.

<sup>2</sup> Utah State Agricultural College, Logan, Utah.

*Achorutes nivicolus* Fitch.    Cove, April 9, among a thick layer of poplar leaves; Providence, Feb. 14; Logan, May 17.

*Achorutes guthrici* Folsom.    Promontory, March 17, on the ground (H. E. Dorst, W. E. Peay, H. F. Thornley).

*Xcnylla baconae* Folsom.    Providence Canyon, March 6.

*Willemia similis* Mills.    Smithfield, March 19, among leaves and bark of dead poplar.

*Friesca claviseta* Axelson.    Hyde Park, March 19, among moldy Lombardy poplar leaves; Smithfield, March 19, under bark of dead poplar; Logan, March 20, among moldy boxelder leaves, and April 1, among pine needles, and under ground beyond the roots of grasses; Rock Canyon of Provo Canyon, October 29, among moldy leaves, bark of boxelder and big-toothed maple.

*Friesca grandis* Mills.    Logan, August 31; Providence Canyon, March 6.

*Neanura muscorum* Templeton.    Lewiston, March 19, among moldy grasses, litter, and leaves of poplar.

*Neanura persimilis* Mills.    Colton, May 11, willow leaves, grass, (H. F. Thornley).

*Onychiurus armatus* (Tullberg).    Logan, Dec. 13, among fallen leaves of boxelder; Smithfield, March 19, among leaves of poplar and pine needles on the ground; Logan, March 20, among moldy boxelder leaves; Randolph, April 20, among cottonwood and shrub leaves.

*Tullbergia collis* Bacon.    Millville, Nov. 16, on the ground and among leaves of poplar; Logan, March 20, among leaves of boxelder; Cove, April, under poplar leaves on ground; Garden City, April 20, among leaves of plum and apple.

#### FAMILY ENTOMOBRYIDAE TÖMÖSVÁRY.

*Folsomides parvus* Folsom.    Big Cottonwood Canyon, May 7, willow leaves.

*Folsomia clongata* MacGillivrayi.    Hyde Park, March 19, among moldy Lombardy poplar leaves; Smithfield, March 19, under bark and among dead poplar leaves; Millville, Nov. 16, among moldy poplar leaves on ground.

*Folsomia diplophthalma* Axelson.    Hyde Park, March 19, among moldy poplar leaves.

*Folsomia fimetaria* Linn.    Hyde Park, March 19, among moldy Lombardy poplar leaves.

*Guthriella antiqua* Folsom.    Murray, May 31, among decomposing celery trimmings.

*Proisotoma aquae* Bacon. Logan, Dec. 13, among moldy boxelder leaves; Woodscross, March 19, among moldy willow leaves and grasses; Odgen, March 13, among grasses on ground; Millville, April 20, among moldy leaves on ground.

*Proisotoma minuta* Tullberg. Logan, March 20, among boxelder leaves on the ground.

*Proisotoma titusi* Folsom. South Promontory, March 17, blackening the ground over large area, (H. E. Dorst, W. E. Peay, H. F. Thornley). This species has sometimes "blackened the ground" in many spots along the highway between Snowville, Utah and Stravell, Idaho (Knowlton).

*Isotomurus palustris* (Müller). Logan Canyon, May 17.

*Isotomurus palustris* var. *texensis* Folsom. Providence Canyon, April 18 (R. S. Roberts).

*Isotoma arborca* Linn. Cove, April 9, among poplar leaves on ground.

*Isotoma minor* Schäffer. Garden City, April 20, among a light covering of plum and apple leaves on ground.

*Isotoma cunotabilis* Folsom. Logan, Dec. 13, among boxelder leaves on ground; Rock Canyon of Provo Canyon, October 29, among moldy leaves and bark of boxelder and maple; Randolph, April 20, among fallen cottonwood leaves; Garden City, April 20, among moldy leaves of plum and apple.

*Isotoma nigrifrons* Folsom. Richmond, March 19, among moldy grasses, livestock bedding, and poplar leaves.

*Isotoma olivacea* Tullberg. Murray, May 31, among decomposing celery trimmings from the 1948 crop.

*Isotoma trispinata* MacGillivrayi. Smithfield, March 19, among fallen pine needles and under leaves and bark of dead poplar; Logan, April 1, under fallen pine needles; Cove, April 9, among poplar leaves on ground and under grass roots.

*Isotoma viridis* Bourlet. Colton, May 11, willow and moldy cottonwood leaves and grass (Knowlton, Ma, and Thornley).

*Isotoma viridis* var. *riparia* Nicolet. Colton, May 11, under cottonwood and willow leaves, grass (Thornley).

*Entomobrya assuta* Folsom. Smithfield, March 19, among leaves and beneath barks of dead poplar; Logan, April 1, among pine needles on ground; Cove, April 9, among moldy poplar leaves on ground.

*Entomobrya purpurascens* Packard. Logan, April 26, among spruce needles on the ground.

*Entomobrya multifasciata* Tullberg. Millville, Nov. 16, among

poplar leaves on ground; Logan, April 1, among pine needles on ground, and also on onion in Utah State Agri., College greenhouse where it was believed to be causing injury.

*Entomobrya marginata* Tullberg. Millville, April 20, among moldy leaves on ground.

*Entomobrya atrocincta* Schött. Logan, April 2, among poplar leaves on ground.

*Entomobrya pseudoperpulchra* Mills. Logan, April 1, among pine needles on ground; Rock Canyon, Oct. 29, among fallen leaves and bark of boxelder and maple.

*Entomobrya nivalis* Linn. Moab, May 7, willow leaves.

*Sira buski* Lubbock. Logan, June 29, on steps of and entering house and basement of a dwelling.

*Sira platani* Nicolet. Logan, August 30, in kitchen sink; Logan, June 22, on steps and entering building. Invading Knowlton home during much of 1948 and spring of 1949.

*Lepidocyrtus cyaneus* Tullberg. Wellsville, May 18, among moldy leaves and grasses; Hyde Park, March 19, among Lombardy poplar leaves on ground; Smithfield, March 19, under bark and leaves of poplar; Millville, Nov. 16, among poplar leaves; Cove, April 9, among poplar leaves; Rock Canyon, Oct. 29, under bark and leaves of boxelder and maple; Randolph, April 20, among cottonwood leaves; Garden City, April 20, among plum and apple leaves on ground.

*Pseudosinella octopunctata* Börner. Woodscross, March 25, among grasses and willow leaves on ground; Logan, April 1, among pine and spruce needles on ground, also among poplar leaves; East Smithfield, April 15, in rotten post on ground; Randolph, April 20, among fallen cottonwood leaves.

*Pseudosinella violenta* Folsom. Logan, August 31, under poplar bark, March 20, among moldy leaves; Randolph, April 20, among cottonwood leaves.

*Pseudosinella sexoculata* Schött. Logan, March 20, April 1, among moldy leaves and grass roots under ground; Logan Canyon, April 3, among maple leaves on ground; Rock Canyon of Provo Canyon, Oct. 22, among boxelder and maple leaves on ground; Randolph, April 20, among cottonwood leaves.

*Pseudosinella alba* Packard. Richmond, March 19, among grass, litter and poplar leaves.

*Tomocerus vulgaris* Tullberg. Logan, April 2, among moldy leaves on ground.

## FAMILY NEELIDAE FOLSOM.

*Neelus minutus* Folsom. Cove, April 9, among fallen poplar leaves.  
*Megalothorax tristani* Denis. Richmond, March 19, among moldy poplar leaves, grasses, and litter.

## FAMILY SMINTHURIDAE LUBBOCK.

*Sminthurides (Sphaeridia) pumilis* Krausbauer. Logan, March 19, among moldy poplar leaves; Richmond, March 19, among moldy grasses, litter, and poplar leaves.  
*Sminthurinus elegans* Fitch. Logan, Dec. 13, among boxelder leaves on ground; Rock Canyon, Oct. 29, among leaves and twigs of maple and boxelder; East Smithfield, April 16, in fragments of rotten post; Millville, April 20, among moldy leaves.  
*Deuterosminthurus repandus* Agren. Laketown, August 18, on raspberry. Numerous on raspberry and strawberry foliage at Garden City, Pickleville, and Laketown, June 1949.  
*Ptenothrix unicolor* Harvey. East Smithfield, April 15, on parts of a rotten post.

Thus in this paper are listed 52 species and 25 genera that occur in Utah. This list will probably be materially increased as examinations continue.

---

**Nemestrinidae in Wyoming.**—As yet there are no published records of nemestrinids from Wyoming, although such flies could be expected there since they have been found in adjoining areas. Professor D. G. Denning recently sent me seven specimens from the collection of the Entomology Department of the University of Wyoming, representing two species. *Necorhynchocephalus sackenii* (Williston): Manville, Niobrara Co., one male, July 17, 1947; Niobrara Co., one female, July 6, 1944. *Trichopsidea (Parasymnictus) clausa* (Osten Sacken): Manville, one male and one female, July 17, 1947, and 2, 1948; Niobrara Co., one male, June 22, 1944; Goshen Co., one male and one female, July 7, 1944 and 1, 1945. All specimens collected by R. D. Pfadt.—J. BEQUAERT, Museum of Comparative Zoology, Cambridge, Massachusetts.

# BULLETIN

OF THE

## BROOKLYN ENTOMOLOGICAL SOCIETY

---

VOL. XLV

JUNE, 1950

No. 3

---

### NEW SPECIES OF NEW WORLD VOLUCELLA.

By F. M. HULL, University, Mississippi.

Several interesting species of *Volucella* have been received recently which are here described. The types are in the author's collection.

#### *Volucella lucilia* n. sp.

Related to *contumax* Curran. The anterior margins of the pteropleura are black and the legs are wholly black and the first abdominal segment is black, except in the middle and upon the sides, besides numerous other differences. Length 8 mm.

Male. *Head*: face and front yellowish white, the former with a distinct, black, medial vitta ending just above the prominent tubercle. There is a wide black stripe from the eye margin to the acute epistoma and the face projects both forward and downward and is deeply concave above with whitish pile on the pale areas and black pile on the tubercle. The cheeks are pale brownish yellow with a posterior, suboccipital, brown band. The pile of the front is whitish, of the vertex black; the ocular pile is yellowish white in color throughout and dense. The antennae are pale brown throughout, the third segment not noticeably darkened above, arista yellowish basally, becoming dark brown towards the apex, with sixteen long rays above. The third antennal segment is slightly concave above, apically narrowed and twice as long as wide. The occiput is black, densely greyish white pollinose; the pile is white except for minute stubby black pile above. *Thorax*: mesonotum black with a strong greenish to coppery reflection. The humeri and adjacent posterior triangle, a triangle immediately behind the transverse suture at the wing base which is continued narrowly back to include the post calli, all pale yellow. The scutellum is concolorous with the mesonotum, the narrow apical margin and the sides more widely and the narrow

base pale yellow. The strong preapical transverse depression is microgranulate. Pile of mesonotum pale yellow, of the scutellum black except basally. The notopleura is shining black without green reflections and has one large black bristle. There are three black bristles over the wing, three on the post calli, three pairs on the scutellum and none in front of the scutellum. The posterior two-thirds of the mesopleura, the pteropleura and a spot above the coxae, all of the metapleura and the greater posterior part of the pteropleura are pale yellow. Otherwise the pleura are blackish and all of their pile yellow white. Squamae white with dark brown border and fringe; halteres white with opaque white knob. *Legs*: entirely black and black pilose. *Wings*: very pale brownish hyaline, the pterostigma broadly brown at the base then pale yellow over the remainder of the basal half, the outer half nearly hyaline. Marginal cell closed in the margin. The subapical cross-vein is strongly recurrent. *Abdomen*: the first segment is yellow with a prominent black spot on either side from base to apex leaving the middle and the side margins yellow. Second segment pale translucent yellow on a little more than the basal half leaving the posterior margin with a wide black band of uniform width, except that near the lateral margin, it narrows and barely reaches the posterior corners. This band sends forward a narrow, brown medial vitta to the base of the segment and the band has a bluish reflection which changes to purple in some lights. Third segment bluish to coppery in reflection with an obscure, short but wide, brownish yellow spot on either side of the base of the segment. This spot does not reach the lateral margins. Fourth segment entirely black with bluish or greenish and coppery reflections. Pile yellowish white on the pale areas and upon the entire fourth segment but otherwise black upon the black areas. First sternite pale yellow, blackish anteriorly on either side, the second uniformly yellow on the posterior third and very narrowly along the base but black in the middle; remaining sternites black.

*Female*. Similar to the male; the front is shining black and rather narrow, with crescentic depressions on either side, leaving the middle of the front convex. The yellow of the face extends widely up the sides of the front to the point where the crescentic impressions begin. Third antennal segment a little darker apically. The marginal cell of the wing is also closed in the margin. The blackish areas of the first abdominal segment are merely light brown but otherwise the abdomen seems to be the same.



Holotype: male, Chanchamayo, Peru, August 3, 1948. Allotype: female, July 3, 1948, 1100 meters. Paratypes: a male, May 12, 1948, 1300 meters, a male Feb. 24, 1949, one paratype female, June 30, 1948, J. Schunke.

***Volucella pertinax* n. sp.**

Related to *contumax* Curran but the facial stripe is complete. The stripe and face are sharp polished ebony black and the legs are wholly black. There are three tiny brown clouds in the center of the wing. Length 9 mm.

Female. *Head*: sides of the face and the sides of the front on the lower third and a stripe on the posterior portion of the cheeks pale yellow and sharply demarcated. The middle of the face and front and all of the front above the lower third and a very wide band from eye margin to the short epistoma, besides a postgenal stripe, are shining black. The tubercle is well developed, the face concave above; all facial pile and frontal pile pale yellow, the pile across the ocelli and behind black in color. The occiput is black except the ventral portion, and is yellowish grey pollenose. The antennae are entirely light brown, the arista brown to the outer third and then black with twenty long rays dorsally. Ocular pile abundant and pale brownish yellow. The front is rather narrow but with very shallow impressed areas along the eye margin which extend narrowly up toward the ocelli and with the middle of the front broadly and shallowly excavated so that this area is perhaps on the same level as the narrow marginal impressions. The upper third of the front is left rather abruptly convex. *Thorax*: mesonotum broadly black with green to coppery reflection, the scutellum of the same color except narrowly along the margin and base. The sides of the mesonotum including humeri and notopleura, the postcalli, the propleura, a spot above the fore coxae, the posterior two-thirds of the mesopleura, all of the pteropleura and metapleura, are pale yellow. The mesonotal pile is widely yellow in the middle with fine, scattered black hairs above the wing, more numerous ones mixed with the yellow along the anterior margin and the pile in front of the scutellum is almost entirely black. The scutellar pile is black except upon the yellow base; the transverse depression is deep and microgranulate. Bristles of thorax black; there is one on the mesopleura, two on notopleura, three above wing, two on postcalli and three pairs on the scutellum. Squamae and fringe dark brown, halteres pale orange, all pleural pile light yellow. *Legs*: entirely sepia black with

black pile. *Wings*: rather uniformly tinged with brownish yellow, the posterior margin and end of the posterior cells more brownish and with less yellow tint. The pterostigma is diffusely brown at the base, deep brownish yellow on the remainder of the basal half and then lighter yellow beyond. Marginal cell closed with a short stalk. The subapical cross-vein is recurrent. There is a small brown cloud at the base of the marginal cell on the small cross vein and at the base of the discal cell. *Abdomen*: first segment and first sternite and the whole of the second segment on its basal two-thirds and its entire lateral margin light translucent yellow. The posterior margin of the second segment is black with opalescent bluish reflections; the black color is a little wider or more extensive sublaterally, then rapidly diminishing; it ends a short distance from the posterior corners. Third segment entirely black with the same reflection, but there are, however, obscure diffuse traces of a reddish brown basal spot on either side. Fourth segment of the same color except that there is a definite, elongate, sublateral, basal, pale brownish red spot situated upon this segment. These spots are shaped like a slender leaf, are diagonally pointed toward midline, but do not quite touch. The pile of the abdomen is erect and pale yellow on all of the pale areas and also narrowly along the entire lateral margin and broadly upon the basal half of the third segment; the remainder of the pile is subappressed and black. The second sternite is widely black with only its narrow, basal margin yellow.

Holotype: female, Chanchamayo, Peru, Feb. 7, 1949, J. Schunke.

***Volucella ulrica* n. sp.**

Related to *mus* Williston but the front is wholly polished shining black and the wings are bicolored. Length 9 mm.

Female. *Head*: face and cheeks and lower occiput light reddish brown. There is a sharp black stripe down the middle of the face, another between face and cheeks; the front is shining black throughout with black pile on the upper half and white pile below. Facial pile white. The face is without pollen, except on the upper portion beneath the antennae, where it extends over the eye margin and runs down the eye margin in a very fine yellowish white line. The antennae are orange brown, the elongate third segment a little darker and narrowly blackish above. Third segment progressively narrowed, nearly twice as long as its basal width, the arista pale yellow, becoming blackish only on the apical third with sixteen long pale rays. The remainder of the occiput black, with grey pollen and whitish pile except immediately behind the vertex where the pile

is black. The front is not wide, the lateral depressions narrow but a little wider anteriorly and the front very gently depressed across the lower third. The pile of the eyes is pale brownish yellow. *Thorax*: mesonotum widely black with a strong reddish purple reflection and a much less pronounced greenish one. Scutellum concolorous except the margin and base are obscurely yellowish brown and not greatly contrasted. The side margins of the thorax throughout are yellowish brown, the humeri, all of the propleura, and all of the anterior pleura lying above the sternopleura and including the anterior two-thirds of the pteropleura are pale brownish yellow. All pleural pile is yellowish. The plumulae are reddish brown, the squamae sepia, the halteres light orange. The bristles of the thorax are black, one upon the notopleura, two above the wing, two on postcalli and three pairs on scutellum; there was one bristle on the mesopleura which is broken off, its base was yellow but the color of the bristle can not be determined. There are no bristles in front of the scutellum. The transverse depression of the scutellum is deep and microgranulate. *Legs*: all of the coxae brown, the femora dark sepia brown or blackish on the basal third and this color is more extensive on the hind pair. All femoral apices yellowish brown. All of the tibiae dark brown, obscurely but narrowly lighter at the base. Anterior tarsi and middle tarsi dark brown, their basal segment a little more yellowish. Upon the hind tarsi the first two segments are yellowish brown, the remaining ones darker. Besides being diffuse the color pattern of the legs is greatly obscured by the heavy black pile. Pile of hind coxae yellow anteriorly. *Wings*: strongly tinged with yellow which changes to brown beginning just before the outer half of the first posterior cell. The ends of the marginal and submarginal cell again become yellowish brown. The base of the pterostigma has a large dark brown spot, the remainder of the basal half or perhaps more deep yellow. There is a small brown cloud at the base of the submarginal cell; the small cross vein and the base of the discal cell are narrowly and obscurely brownish. Marginal cell widely opened but not so wide as its apical width. Subapical cross vein strongly recurrent. *Abdomen*: first segment and anterior three-fourths of the second, the whole lateral margins of the second and the first two sternites pale translucent yellow. The posterior margin of the second segment is black extending forward a little more deeply sublaterally. The whole third segment in some lights appears to be blackish from the dorsal view with milky bluish reflections; however,

turned over on the side, the lateral margins are not yellowish brown but this color extends widely inward on the basal half although it is obscure and diffuse. The fourth segment is similarly black, the lateral margin narrowly yellowish brown with a pair of distinct, slender, leaf-shaped, yellowish brown spots beginning at the base near the sides and extending obliquely inward toward the midline where they remain widely separated. Pile of abdomen yellowish on the pale areas and black upon the black areas including all of the very short fifth segment, except its lateral margin. Third sternite pale yellow with obscure, brown post medial bands.

Holotype: a female, Chanchamayo, Peru, Jan. 20, 1949, 1300 meters; J. Schunke.

### ***Volucella astarte* n. sp.**

Related to *panamena* Curran. The pale grey wing has a blackish spot in the middle, which diffusely grades out along the marginal and submarginal cells. Pterostigma and the end of the costal cell very dark. Length 13 mm.

Male. *Head*: face, cheeks and front light brownish orange. There is a shallow crease running diagonally from the eyes and directed towards the epistoma which leaves the greater part of the cheeks marked off by a distinct ridge-like line which, however, is not raised above the general surface. The tubercle is well developed, the face quite concave, with pale yellowish pollen, which is restricted to a broad band across the upper part of the face. The pile of the front and face is reddish golden. The antennae are entirely orange, the third segment barely concave above, narrowest on the apical half and twice as long as its basal width. Arista yellowish basally, becoming black on the apical half with thirty-four long rays above. Eyes touching for a considerable distance leaving the front quite small; the upper facets are greatly enlarged; the eyes have thick, abundant, pale brown pile on the upper half and none below. Vertex minute, restricted to the ocelli, the pile chiefly blackish. Occiput black with pale grown pollen and yellow pile throughout. *Thorax*: mesonotum dark shining reddish brown, lighter on the humeri and the lateral margins, the pleura are also reddish brown, a little lighter dorsally and anteriorly. The scutellum is dark sepia with a pronounced coppery reflection, without preapical depression. Pile of mesonotum chiefly reddish yellow anteriorly with a very few fine black hairs and almost entirely black beyond the middle. Bristles of thorax strong and black; there is one on the mesopleura,

three on notopleura, three above wing, four on the postcalli and five to six pairs on the scutellum. Scutellar discal pile black; squamae and fringe sepia, halteres yellow with opaque white knob; plumulae reddish sepia. *Legs*: all of the femora reddish brown, their tibiae very dark reddish sepia, the tarsi of the same color, the hind basi tarsi perhaps a little lighter. The pile of the legs is black. *Wings*: elongate, quite heavily tinged with brownish grey. There is a conspicuous, subquadrate, brownish spot in the middle of the wing which grades off anteriorly into the marginal and submarginal cell; this spot also includes in the quadrate area the upper portion of the discal cell and is continued widely along each side of the first short section of the third medial vein. Spurious vein faint, the outer loop of subapical cross vein short, marginal cell closed and stalked. Pterostigma extremely dark brown, the end of the cell paler but the darkest portion includes the end of the costal cell. *Abdomen*: first segment and the base of the second in the middle subtranslucent, reddish brown, the remainder of the second segment is dark sepia in the middle and laterally where it tends to be also covered by a blue green reflection. Third and fourth segments blackish with brilliant blue green reflection which in places has changed to a coppery color. Pile of the abdomen yellowish in the first and base of the second segments, reddish brown narrowly along the posterolateral margins and erect and black and dense elsewhere. The pile is very dense and short on the second segment, less dense and longer on the third and sparse, fine and long on the fourth. Sternites reddish brown, the fifth nearly black, the pile yellowish.

Holotype: male, Pucallpa, Peru, Jan. 22, 1948, 180 meters. J. Schunke.

---

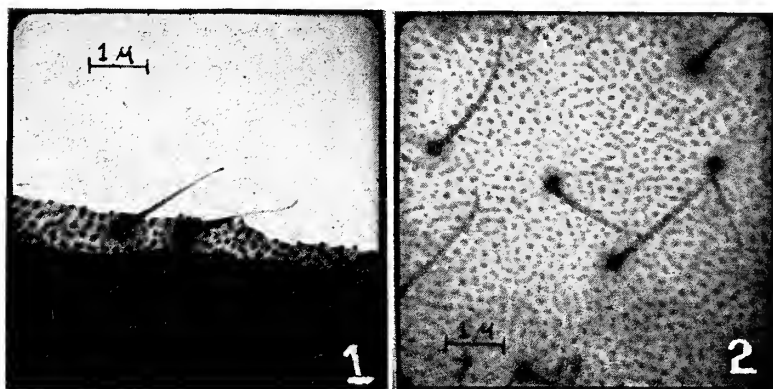
**Neosymdobius aphids:** *N. annulata* (Koch) was present in moderately injurious abundance on cut-leaf weeping birch at both Hooper and Ogden, Utah, August 21 and September 27, 1939. This also was collected on *Betula papyrifera* at Logan, August 8, 1925; on white birch at Spokane, Washington, September 11, 1943 (D. L. Bischoff); and on *Betula* in Little Cottonwood Canyon, Utah, August 22, 1935, and at Fielding, Utah. *N. albasiphus* (Davis) on *Quercus stellata*, Fayetteville, Ark., September 21, 1938 (M. Sanderson). *N. intermedius* (G.-P.) on *Betula fontinalis*, taken eleven miles south of Woodruff, Utah, August 5, 1939. G. F. KNOWLTON, Logan, Utah.

## THE MICROTRICHIAE OF URANOTAENIA.

By G. S. TULLOCH and J. E. SHAPIRO, Brooklyn, New York.

The inability of early investigators to detect the presence of small microtrichiae on the wings of uranotine mosquitoes resulted in the establishment of the erroneous taxonomic character "absence of microtrichiae" for the separation of the *Uranotaenia* from other culicine genera. Despite the fact that the presence of uranotine microtrichiae has been established (1, 2)\*, some of the current medical entomological textbooks still persist in including this erroneous character in their consideration of the generic features of mosquitoes. The purpose of this paper is to describe and to provide electron micrographs of these structures as well as other features of the uranotine wing membrane.

Under low magnification, 100 $\times$ , of the light microscope the microtrichiae of *Uranotaenia sapphirina* (O.S.) appear as extremely small closely spaced dots. At higher magnifications, 430 and 970 $\times$ , these dots may be identified as the bases of the microtrichiae and from each there arises a delicate, tapering shaft. With the electron microscope, 7800 $\times$ , it is possible to note that these structures vary in length from 2 to 4 microns and each is characterized by a relatively thick, short basal portion and a thin tapering shaft which terminates in a minute bulbous tip (Figs. 1 and 2). There is no



FIGS. 1 and 2. Electron micrographs of microtrichiae and wing membranes of *Uranotaenia sapphirina* O.S.

\* Numbers refer to Literature Cited.

indication of the annulations on the shafts as reported for *Anopheles quadrimaculatus* Say (3) or *A. albimanus* Wied. (4) nor of the areas of greater thickness or density in the wing membrane contiguous to the bases as may be observed in *A. albimanus*, *Culex pipiens* L. or *Aedes aegypti* L. Although the uranotine microtrichiae are less than one half the size of those of *A. albimanus* and *C. pipiens*, their number in any unit area is nearly twice that of the latter species.

A mottled appearance is imparted to the wing membrane by the presence of numerous small well-defined areas about .06 microns in diameter which are located in both the upper and lower surfaces (Fig. 2). The discrete nature of these areas or dots may be observed particularly well along the torn edges of the wing membranes but it cannot yet be determined whether they represent thickenings or areas of greater density than the general groundwork of the wing. A similar mottling has been observed in the wings of *Wyeomyia smithi* (Coq.) and *C. pipiens* but in these species the areas are not as sharply delimited as in *Uranotaenia*. Discrete areas are present in *A. aegypti* but they are not as distinct and less numerous while in *A. albimanus* these areas are practically absent.

In the species mentioned above, it was observed that a decrease in the mottling of the wing was accompanied by an increase in the size of the areas of greater thickness or density contiguous to the microtrichial bases. It has not been determined if this relationship is correlative or coincidental.

#### LITERATURE CITED.

1. Hegner, R, *et al* 1938. Parasitology. D. Appleton-Century Company, New York, N. Y.
2. Pratt, H. D. 1946. Ann. Ent. Soc. America, XXXIX, No. 4, pp. 576-584.
3. Richards, A. G. Jr. 1944. Ent. News, LV, No. 10, pp. 260-262.
4. Tulloch, G. S. & J. E. Shapiro. 1950. Bull. Brooklyn Ent. Soc. XLV, No. 2, pp. 48-49.

**GLYCOGEN METABOLISM IN INSECTS: A REVIEW.**

By MORRIS ROCKSTEIN, Pullman, Washington.

## I. INTRODUCTION

Since the early discoveries of Claude Bernard of the importance of glycogen as the storage form of carbohydrates in animals, a wealth of complicated chemical and physiological data have been accumulated concerning its metabolism. Especially rapid advances during the past fifteen years in the field of enzymology have greatly clarified the complex intermediary metabolism of carbohydrates and of glycogen, in many vertebrate and invertebrate animals. Surprisingly, however, of all forms studied, insects, the most numerous of animals, have been least explored in this respect. With the above in mind, this review has been written to include a comprehensive picture of the present knowledge of glycogen metabolism in insects, with the chief aim of pointing to possibilities for further study in this field.

## II. GLYCOGEN IN INSECTS

The ability of insects to utilize glycogen has been studied in two different ways; by feeding experiments in which the diet included glycogen and by tests for the presence of the enzyme glycogenase, the latter assuming that glycogen in the diet is normally used. Bertholf (1927) found that honeybees could not utilize glycogen. Fraenkel (1936) showed that the blowfly (*Calliphora erythrocephala*) could substitute many sugars for cane sugar in its diet, including glycogen. This was taken as evidence of the presence of glycogenase in the alimentary canal of this species. In an extensive study in the southern armyworm (*Prodenia eridania*) Babers and Woke (1937) demonstrated the presence of glycogenase in the *tissue* of the midgut alone, although it was present in the lumen of the various divisions of the alimentary canal. They assumed that glycogenase was secreted only by the midgut and suggested its presence elsewhere was the result of elaboration by microfloral inhabitants. Simmons (1939) also demonstrated the presence of glycogenase in the cattle grub (*Hypoderma lineatum*) alimentary canal and that it was secreted by the lining of the mid-intestine itself. Parkin (1940) in a study of the carbohydrases of wood-boring beetles, found no evidence of glycogenase although other polysaccharases like cellulase and hemicellulases were demonstrated in several groups of these phytophagous forms.



The first demonstration of glycogen in insects was made by Claude Bernard (1885) who described fly larvae as "veritable sacs of glycogen." The primary seat of glycogen storage in insects, established by histochemical methods, is the fat body, and secondarily the blood cells and midgut epithelial cells. Yeager and Munson (1941) in an extended study on the incidence of glycogen in the tissues of the southern armyworm (*Prodenia eridania*) gave an excellent recapitulation of the work done on the occurrence of glycogen in the tissues of various insects studied prior to that year. These tissues included muscle, oenocytes and even the malpighian tubules. Wigglesworth, in a later study (1942), found glycogen in the ganglia and in muscle connectives of newly-moulted fourth-instar larvae of *Aedes* mosquitoes, as well as in the epithelial cells of the posterior half of the midgut and in the fat body of the thorax. Snodgrass (1925) points out that the storage of glycogen in the fat body of the honeybee larva, despite its inability to use glycogen from the diet directly, suggests that the fat body corresponds to the liver of higher animals as a site of glycogen synthesis and storage. Babers (1941) comes to a similar conclusion regarding the fat body of insects and the liver of vertebrate forms.

### III. THE PHYSIOLOGY OF GLYCOGEN METABOLISM IN INSECTS

Claude Bernard's findings included the important fact that glycogen stores decreased gradually with metamorphosis. This was the first of a long series of reports on glycogen occurrence and its relation to metamorphosis and development. Bataillon and Couvreur (1892) and Bataillon (1893) found that the glycogen content of the silkworm reached a maximum at the end of the larval stage, the chrysalis containing twice as much as the larva. During the pupal stage, glycogen content fell slowly to a minimum at the time of emergence of the adult. Reducing sugars like glucose, on the other hand, increased during metamorphosis to a maximum at three to four days before emergence of the adult from the chrysalis. Vaney and Maignon (1905) reported a similar diminution of glycogen in the silkworm from egg to larval emergence. Only 30% of the original glycogen remained at that time. In contrast to the above, Kaneko (1924) and Minoya (1932) reported no glycogen at all at the time of hatching in the silkworm larva. Kaneko also showed that glycogen increased in the larva to a maximum just prior to pupation. This he associated with the continuous feeding during the larval period on the carbohydrate-

rich mulberry leaves. Nelson, Sturtevant and Lineburg (1924) also showed a similar association of glycogen storage and carbohydrate diet in the honeybee larva. Frew (1929) suggested that glucose in the blowfly larvae (probably *Calliphora* sp.) occurring in two peaks, was probably converted from stored fat and protein, since he could not find any glycogen in the larvae or pupae. Snodgrass (op. cit.) quotes Straus as reporting a low glycogen content in larval honeybee until the third day, rising to a peak at the beginning of pupation. Rudolfs (1929) found that glycogen stores in overwintering eggs of the eastern tent caterpillar (*Mala-cosoma americana*) decreased to a minimum at hatching. In the larva, glycogen content showed two peaks, with a final high at the end of the prepupal stage and a final minimum at adult emergence. In the bee moth (*Galleria mellonella*), Crescitelli and Taylor (1935) found no glycogen in the prepupal and pupal stages. They assumed that reducing sugars, assumed to be glucose, could therefore arise from fats and proteins. This was partly substantiated by Taylor and Steinbach (1931) who reported a low respiratory quotient (R.Q.) during pupal development of the bee moth. Ludwig (1932) found that glucose increased markedly from the late prepupal to early pupal stages of the Japanese beetle, to a maximum at adult emergence; no data on glycogen were presented. Evans (1932) found glycogen in the sheep blowfly, in contrast to Frew (see above), and Babers (1941) questioned the validity of the findings of Evans. However, Evans also reported a steady fall in glucose during the pupal period of the sheep blowfly and of the mealworm. Finally, Yeager and Munson (1941) and Munson and Yeager (1944) reported that blood glycogen in the southern armyworm rose steadily during the larval stage, reaching a maximum at pupation, and falling again during metamorphosis. Babers (1941) found a similar disappearance of glycogen at hatching of the egg, reappearance in the larva, rising to a maximum at pupation and falling again during the pupal period. The paper by Babers has an excellent bibliography on carbohydrate metabolism of insects up to (and including) 1939. Needham (1942) summarized the significance of much of the above work in terms of adaptation by holometabolous insects to their type of metamorphosis; i.e., glycogen is the storage form of energy built up during the feeding larval stage and utilized during pupal development in the final transformation to the imago. He pointed out that in this development, the silkworm used as much as 100%, the eastern tent cater-

pillar 94%, the blowfly (*Calliphora vomitoria*) 73% and the honey-bee 94% of the original stores of larval glycogen. Related to growth and development is the process of moulting and the production of a new cuticle. Needham (1931) cited Tichomirov as first noting that the chitin in silkworm was formed just at the time when glycogen stores disappeared. Paillot's excellent studies (1937, 1938) on the silkworm lead him to conclude that "glycogen plays a direct part in the building of a new cuticle." He found glycogen to be heavily deposited in the epidermal cells, and in all the epithelial tissue having a "chitinous" lining, just prior to moulting. Furthermore, the normal storage points of glycogen, fat cells, lost their glycogen at the same time. Since the basic structure of chitin is recognizedly a polyglucoside, these findings are especially important in clarifying our understanding of the intermediary metabolism in the laying down of the chitinous portion of the cuticle, wherever present.

Within the past ten years several workers have attempted to correlate insect flight activity with carbohydrate metabolism. Chadwick and Gilmour (1940) first suggested that the limiting factor in flight duration of *Drosophila repleta* was physiological fatiguing in the form of depleted reserve food stuffs. Williams, Barness and Sawyer (1943) continued this study in *D. funebris* and in *Lucilia sericata* and found a progressive decrease in glycogen concentration with extended flight. They also found that greater endurance in flying by younger insects was correlated with the possession of a higher glycogen content than older animals.

Finally, some workers, especially biochemists and general physiologists working with insects, have attempted to establish the chemical basis of insect glycogen metabolism. This has primarily involved chemical analyses for the presence of phosphorous compounds and studies of respiratory quotients. Davis and Slater (1926, 1928) and Slater (1927), in a study on the aerobic and anaerobic metabolism of *Periplaneta orientalis* concluded that a similar mechanism existed in the roach for the supply of energy, in the anaerobic phase of muscle contraction, as in higher animals, viz., a glycogen to lactic acid breakdown in the absence of oxygen. Boell (1935) without referring to glycogen *per se*, suggested that a low respiratory quotient, following an initial value of close to unity in the embryonic development of *Melanoplus differentialis*, meant a fat to carbohydrate conversion in the later stages. Hitchcock and Haub (1941), in a study on metabolism of the various

stages of the blowfly (*Phormia regina*) also assumed that, an R.Q. of 0.77 falling to 0.50 during metamorphosis, correlated with a rise in carbohydrate in the form of reducing sugar, meant a fat to carbohydrate conversion. Steinhart (1935) found at hatching of locust eggs almost twice as much adenosine triphosphate (ATP), a primary source of energy, as at the beginning of egg development. Heller (1936) also found a low ATP content during diapause of butterfly (*Deiliphila euphorbiae*) pupae, with a high content in the active pupa. Male adults, generally more active than females in this species, were found to have a higher ATP content. Heller concluded that glycolysis must necessarily be high with increased muscular activity, and that an ATP enzyme system was involved here similar to that of higher animals. "ATP is the pivot around which the cycle of phosphoric exchanges of glycogenolysis revolves", suggested Heller. Baldwin and Needham (1934) had previously found ATP in the muscles of *Calliphora* and *Lucilia* spp. together with reducing sugar in the form of a hexose monophosphate. Since the latter increases with muscle stimulation (Cori, 1941), the findings of Baldwin and Needham are an important contribution to the correlation of muscular activity with glycolysis in insects. Thompson and Bodine (1938) also found a high ATP concentration at the beginning of egg development, which fell to a minimum during diapause in *M. differentialis* grasshopper eggs. This corresponded to the findings of Boell (cited above) of an R.Q. of one at the beginning of egg development falling during diapause. Gilmour (1941), in a study of aerobic and anaerobic metabolism in larvae of *Tenebrio molitor*, found ten times as much glycogen consumed in anaerobiosis with a corresponding higher lactic acid production than in aerobiosis. However, during recovery from anaerobic metabolism lactic acid disappeared but with no significant increase in glycogen content. Albaum and Kletzkina (1948) isolated ATP from *D. melanogaster* and stated that it was apparently "identical with that obtained from mammalian muscle." Albaum (1949) also found ATP in two species of Coleoptera, one species of Isoptera and one species of Orthoptera. The enzyme adenosine triphosphatase (ATP-ase) was isolated by Gilmour (1948) from grasshopper myosin, prepared from the thoracic and hind femoral muscles. Its enzyme activity was tested against both rabbit and grasshopper ATP, and it was found to split both labile phosphates of ATP.

In the past two years significant contributions to the knowledge

of glycolytic processes in insects have been made by Barron and Tahmisian (1948) and Humphrey (1949). The former workers, in enzymological studies of metabolism of insect muscles, by methods developed in the study of muscle metabolism of higher vertebrates, found that leg muscles of the adult roach (*P. americana*) showed similar chemical pathways to those found in mammalian muscle in aerobic metabolism. Certain discrepancies were found in insect anaerobic glycolysis, however, since iodacetic acid, which inhibited  $\text{CO}_2$  production, had no effect on lactic acid formation. Addition of ATP resulted in the disappearance of the  $\text{CO}_2$  inhibition by iodacetic acid. Humphrey, in his glycolysis studies, reported he could obtain both lactic and pyruvic acid from homogenized leg muscles of the same species of roach, as well as from grasshopper muscle (*Locusta migratoria*). However, he and Siggins (work to be published) reported a glycolytic pattern not typical of vertebrates, although acid production from all 6-carbon intermediates usually associated with vertebrate glycolytic reactions did occur, in the grasshopper.

#### IV. SUMMARY

Glycogen metabolism of insects was reviewed from *three* main aspects; glycogen occurrence in insects; the physiological basis of metabolism of glycogen in insects; chemical aspects of insect glycogen metabolism.

It was shown that certain species of insects are capable of utilizing glycogen in their diets and that glycogen is stored primarily in the fat body, the latter described by some workers as having the same function as the liver of higher animals with respect to glycogen metabolism.

Extensive studies on the presence of glycogen in the various stages of development, and its association with other nutrients at these times, have shown that glycogen is a storage form, which is usually built up to a high level by the active feeding larvae of holometabolous insects. This storage reaches a maximum just before pupation, glycogen content falling during metamorphosis from pupa to adult as the glucose content rises to a maximum just before adult emergence. In insects where glycogen was absent, it was suggested that fat or protein conversion (to sugar) takes place to account for the presence of reducing sugars in conjunction with respiratory quotients reported in such species. In the case of certain flying species, the importance of glycogen as the limiting factor in the duration of flight has been demonstrated.

Finally some of the chemical aspects of glycogen metabolism were discussed. The presence of adenosine triphosphate (ATP) has been associated with a respiratory quotient indicative of carbohydrate metabolism during development, and with storage and utilization of glycogen generally. High ATP content has been associated with glycolysis experimentally, and low ATP with increased glycogen storage, to establish a fundamental basis for glycogen metabolism in insects. The isolation of adenosine triphosphatase and very recent enzymological studies suggest that the chemical processes involved in glycogen metabolism in insects follow a pattern not dissimilar from that already established in higher animals.

## LITERATURE CITED

- Albaum, H. G. 1949. *Bull. Bklyn. Entomol. Soc.* 44: 56.  
Albaum, H. G. and M. Kletzkyn 1948. *Arch. Biochem.* 16: 333.  
Babers, F. H. 1941. *J. Agri. Research* 62: 509.  
Babers, F. H. and P. A. Woke 1937. *J. Agri. Research* 54: 547.  
Baldwin, E. and D. M. Needham 1933. *J. Physiol. (London)* 80: 221.  
Barron, E. S. G. and T. H. Tahmisian 1948. *J. Cell. Comp. Physiol.* 32: 57.  
Bataillon, E. 1893. *Bull. Sci. France Belg.* 25: 18.  
Bataillon, E. and E. Cuvreur 1892. *Compt. Rend. Soc. Biol.* 44: 669.  
Bernard, C. 1885. Paris. *Leçons sur les phénomènes de la vie.* Vol. II, Ch. 2, 5.  
Bertholf, L. M. 1927. *J. Agri. Research* 35: 429.  
Boell, E. J. 1935. *J. Cell. Comp. Physiol.* 6: 369.  
Chadwick, L. E. and D. Gilmour 1940. *Physiol. Zool.* 13: 398.  
Cori, C. F. 1941. *Biol. Symposia* 5: 131.  
Crescitelli, F. and I. R. Taylor 1935. *J. Biol. Chem.* 108: 349.  
Davis, J. G. and W. K. Slater 1926. *Biochem. J.* 20: 1167.  
——— 1928. *Biochem. J.* 22: 331.  
Evans, A. C. 1932. *J. Exp. Biol.* 9: 314.  
Fraenkel, G. 1936. *Nature* 137: 237.  
Frew, J. G. H. 1929. *Brit. J. Exp. Biol.* 6: 205.  
Gilmour, D. 1941. *J. Cell. Comp. Physiol.* 18: 93.  
——— 1948. *J. Biol. Chem.* 175: 477.

- Heller, G. 1936. *Compt. Rend. Soc. Biol.* 121: 414.
- Hitchcock, F. A. and J. G. Haub 1941. *Ann. Entomol. Soc. Am.* 34: 32.
- Humphrey, G. F. 1949. *J. Cell. Comp. Physiol.* 34: 323.
- Kaneka, S. 1924. *Trans. Japan. Path. Soc.* 14: 229.
- Ludwig, D. 1932. *Anat. Record* 54, Supplement, Abstr. 52: 43.
- Minoya, K. 1932. *Japan. J. Med. Sc. II. Biochem.* 3: 75.
- Munson, S. C. and J. F. Yeager 1944. *Ann. Entomol. Soc. Am.* 37: 396.
- Needham, J. 1931. *Chemical Embryology*. Cambridge Univ. Press. Vol. II: 1047.
- 1942. *Biochemistry and Morphogenesis*. Cambridge University Press, p. 470.
- Nelson, J. A., A. P. Sturtevant and B. Lineburg 1924. *U.S.D.A. Dept. Bull. #1222*: 14.
- Paillot, A. 1937. *Compt. Rend. (Acad. Sci.)* 205: 1095.
- 1938. *Compt. Rend. Soc. Biol.* 127: 1502.
- Parkin, E. A. 1940. *J. Exp. Biol.* 17: 364.
- Rudolfs, G. 1929. *J. N. Y. Entomol. Soc.* 37: 17.
- Simmons, S. W. 1939. *Ann. Entomol. Soc. Am.* 32: 621.
- Slater, W. K. 1927. *Biochem. J.* 21: 198.
- Snodgrass, R. E. 1925. *Anatomy and Physiology of the Honey-bee*. McGraw-Hill, New York. p. 212.
- Steinhart, K. M. 1935. *Advances in Modern Biology*. USSR 19: 216. (Engl. Abstr.)
- Taylor, I. R. and H. B. Steinbach 1931. *Physiol. Zool.* 4: 604.
- Thompson, V. P. and J. H. Bodine 1938. *J. Cell. Comp. Physiol.* 12: 247.
- Vaney, C. and F. Maignon 1905. *Compt. Rend. (Acad. Sci.)* 140: 1192.
- Wigglesworth, V. B. J. 1942. *J. Exp. Biol.* 19: 56.
- Williams, C. H., L. A. Barness and W. H. Sawyer 1943. *Biol. Bull.* 84: 263.
- Yeager, J. F. and S. C. Munson 1941. *J. Agri. Research* 63: 257.

**ALAN SLOAN NICOLAY.**

By GEORGE S. TULLOCH, Merrick, N. Y.

Alan Sloan Nicolay, long a member of the Brooklyn Entomological Society, died suddenly at his home in Upper Montclair, New Jersey on January 29, 1950.

Born in Brooklyn on September 29, 1893, he early became interested in entomology and he was a frequent visitor at the meetings of the Brooklyn Society in the days when the rear room of Franck's Entomological Shop served as a meeting place. He became a member of the Society in 1914. That same year his first paper on the Mordellidae of New York was published in the Bulletin. During World War I he served with the American Expeditionary Force in France. Following the Armistice he was stationed near Verdun as a billeting officer for the soldiers returning from the trenches. While on this assignment, he found time to further his study of the Coleoptera. An account of his observations made in this area appeared in the Bulletin in February, 1920.

Most of his life Nicolay was in the textile business. Yet he was the author or co-author of more than twenty scientific papers which appeared in such publications as the Journal of the New York Entomological Society, Entomological News, Canadian Entomologist, Journal of Economic Entomology and the Bulletin of this Society. His main interest was in the taxonomy of beetles, specifically the Buprestidae, Cerambycidae, Mordellidae, Carabidae and Cicindelidae. He collected extensively in New York, New Jersey and Maine. He was also active in the preparation of lists of beetles from these areas.

Although to Nicolay entomology was only on avocation, his notable contributions to this science compare favorably with those made by many professional entomologists. Entomology will remember him as an outstanding student of the Coleoptera. The Society will especially remember him as an outstanding colleague and collector.



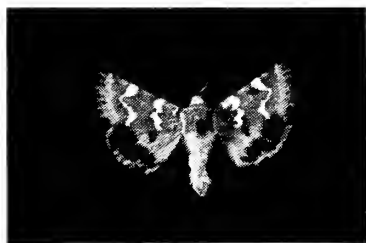
## A NEW HELIOTHID FROM NEW MEXICO.

By ROWLAND R. MCELVARE, Port Washington, Long Island, N. Y.

### *Dasyspoudaea zuni* sp. n.

Palpi porrect, heavily clothed with hair, terminal segment closely scaled. Head and thorax covered with long hair, brown and white mixed. Abdomen yellow. Tibiae spinose, foretibiae broad with a long inner and shorter outer terminal claw, and three spines on each side.

Primaries olive brown. Transverse lines bold, silvery white, outlined by black scales. Some rust colored scales in costal half of basal area. Basal half band present. T.a. line perpendicular, crenelated. Reniform vaguely indicated by a patch of dark scales. T.p. line has a zigzag outline, wide at costa, narrowing as it angles outward, then becoming wide again after turning inward. Sub-terminal line marked by black and rust colored scales at costa and outlined by a lighter shade of the ground color. Terminal line indicated by clusters of black scales. Fringes checkered, dark brown and white.



Secondaries yellow with a broad smoky brown marginal band, narrowing toward the anal angle and with a slightly dentate inner edge. Smoky discal lunule well defined. Fringes with basal half smoky, outer half whitish, becoming entirely so toward anal angle.

Under side: Primaries yellow, paler along the costa. Smoky brown reniform. Basal dash and orbicular indicated. Broad smoky brown marginal band, broken at vein VII., continued to costa by two slightly rust colored lines, edged outwardly along external margin of wing by a narrow yellow shading. Fine broken dark terminal line. Fringes pale basally, checkered brown and white outwardly. Secondaries yellow, paler along costa and outer

margin. Lunule indicated. Curved postmedian slightly rust colored line, enlarging to a smoky brown irregular patch above anal angle. Traces of a subterminal line parallel to postmedian line and ending in patch mentioned above. Fringes whitish.

Expanse 26 mm.

Holotype male, July 24, 1948, Black Rock, Zuni Indian Reservation, McKinley Co., New Mexico. L. C. Wyman, collector.

Allotype female, as above.

Paratypes, 1 male, 1 female, July 21, 1948, otherwise as above.

All specimens in U. S. National Museum Collection except paratype male in collection of R. R. McElvare, Port Washington, New York.

This new species is nearest to *D. meadi* Grote, described from the neighboring state of Colorado. It may be readily differentiated from *meadi*, however, by the bold silvery white transverse lines in the primaries and the deeper coloring of the secondaries.

**Two Unrecorded Homonyms in the Genus *Euxoa* (Lepid. Phalaeninae).**—*Euxoa orbicularis* Smith. Described originally as an *Agrotis* (1887, Proc. U.S.N.M., vol. 10, p. 460) the name is antedated by *Agrotis orbicularis* Walker (1865, Cat. Lep. Het. Brit. Mus., pt. 32, p. 700). This disposes satisfactorily of a name, the identity of which has long been a bone of contention among workers in the genus. It also obviates the necessity of using *orbicularis* to replace the much better known *misturata* Smith as was recently suggested by me (1949, Amer. Mus. Novitates, no. 1394, p. 5).

*Euxoa incallida* Smith. Also described as an *Agrotis* but a primary homonym of *Agrotis incallida* Walker (1856, Cat. Lep. Het. Brit. Mus., pt. 10, p. 330). Smith's name represented at the best a very doubtful form of the difficult *quinquelinea* complex and the single female on which the name was based came from the same region as the female type of *quinquelinea*, viz., Truckee, California, where Henry Edwards and McGlashan used to do a great deal of collecting in the early days.—JAMES H. McDUNNOUGH, New York, N. Y.

**NOTES ON THE FOOD HABITS OF STRUMIGENYS  
LOUISIANAE ROGER (HYMENOPTERA:  
FORMICIDAE).**

By EDWARD O. WILSON, JR., University, Alabama.

Although *Strumigenys louisianae* Roger is quite common in the Southern States and one of the most interesting of our native ants, its biology has never been thoroughly studied, and apparently nothing has been published on its food habits. Therefore, recent observations on the food preferences of two colonies kept in captivity seem worthy of note. These colonies were taken two weeks apart in Mobile, Alabama and in Allgood, Blount Co., Alabama during October 1949, and were established in small modified Janet nests. They have been kept under observation for a period of three months.

The evidence which has been accumulated so far seems to indicate that this species normally preys on certain groups of Collembola and that it may also feed upon a few other small arthropods, particularly if these are dead or injured. Collembola accepted by the ants, or else rejected, are given at the end of this article. Those springtails classified as "accepted" were either captured alive or taken when dead or injured and were retrieved and preserved after the ants had carried them into the brood chambers. Those classified as "rejected" were never observed to be molested as they wandered through the nest, meeting foraging worker ants, entering the brood chambers, and even reposing in the galleries as workers passed over them. There may even be further selectivity within the accepted group, for the ants seemed to prefer entomobryids over isotomids, only occasionally taking one of the latter. In the artificial nests the ants were observed to stalk the Collembola only for very short distances, and were apparently unaware of them when more than a few millimeters away. They approached the springtails in cautious slow motion, spreading their mandibles apart almost 180° and striking suddenly when little less than a mandible-length away. In the catches observed, the ants lifted their prey into the air immediately upon seizing them and curled their abdomens forward in an attempt to sting. The Collembola offered surprisingly little resistance, usually remaining entirely passive, and were either dead or completely crippled when dropped to the floor shortly afterwards. Only once was a springtail observed to use its furcula forcefully; as it was seized on a wall of

the food chamber, it kicked itself and the ant about one centimeter out into the chamber. However, the ant retained a firm grip and quickly subdued it.

In addition to Collembola, a wide variety of other arthropods were offered to the ants. These include millipedes, symphylans, mites, spiders, pseudoscorpions, aphids, psocids, thrips (*Tubulifera*), small beetles and beetle larvae, flies, roaches, termites, homopteran nymphs, etc. Of these, only very small termite nymphs (*Reticulitermes* sp.) were accepted when active and uninjured. Flies of two families (*Psychodidae*, *Phyllomyzidae*), symphylans (*Scutigera* sp.), and a single adult psocid were accepted when dead or injured. However, once in the brood chamber, the flies and the psocid were either ignored or fed upon very sparingly.

Four nests of *louisianae* were examined in the field, and one of these (Tuscaloosa, Alabama, May 9, 1949, collected by B. D. Valentine) contained recognizable remains in the galleries. Certain of these remains were determined as Collembola: *Isotoma viridis* Bourlet, *Proisotoma* sp., and *Entomobrya* probably new sp. by Mr. Christiansen.

The writer wishes to express his thanks to Mr. Kenneth Christiansen for determining the Collembola and to Mr. W. L. Brown, Jr. for checking the determinations of the ants.

Collembola accepted by the ants:

*Lepidocyrtus eyanens* Tullberg  
*Entomobrya ?purpurascens* Packard  
*Ptenothrix marmorata* (Packard)  
*Salina decorata* Mills  
*Isotoma ?subviridis* Folsom

Collembola rejected by the ants:

*Neannura muscorum* (Templeton)  
*Hypogastrura* probably new species

**Calaphis coloradensis** Granov. This small green birch aphid often has been encountered along streams in Utah, on *Betula fontinalis*, sometimes in moderately injurious abundance on undersides of the leaves. Collections include: Monte Cristo, Utah, July 18, 1939; Mink Creek, Idaho, July 1947; and Chateau, Montana, July 23, 1946; Indian Creek, Utah, May 11, 1949, and Devil's Slide, Utah, July 24, 1945. G. F. KNOWLTON, Logan, Utah.

## SUPPLEMENTARY NOTES ON THE FEEDING OF DACETINE ANTS.

By WILLIAM L. BROWN, JR., Cambridge, Mass.

Mr. E. O. Wilson, Jr. has described in another part of this issue the feeding of *Strumigenys* (*s. str.*) *louisianae* Roger upon Collembola. Entomobryidae (*s. lat.*) and Isotomidae were accepted, and the former were preferred. Hypogastruridae and Neanurinae were rejected. Wilson's is the first fully documented report of *Strumigenys* (as I have restricted the genus) feeding upon Collembola. The classical observations of the Wessons (1936, 1939) and all subsequent recorded instances of Collembolans being preyed upon by dacetines were made upon ants now included in *Smithistruma* Brown.

A very brief observation was recorded by Weber (1939), in which that author recorded a *Strumigenys* worker carrying a dead collembolan in its jaws. There was nothing in this note to indicate whether the ant belonged to *Strumigenys* or to *Smithistruma* as now known. The springtail was identified as *Entomobrya* sp. by Mills. Dr. Weber has recently traced both the specimen and his notes in his very full records from his South American collecting tours. The dacetine seen to be carrying the dead specimen of *Entomobrya* was taken by Dr. Weber in the interior of British Guiana; this has been sent to me and proves to be *Strumigenys* (*Strumigenys*) *elongata* Roger, a very common Neotropical dacetine.

On the basis of this observation and those accumulated by the Wessons (1936, 1939), Jones and Pfitzer (*mss.* and *in lit.*), Brown (*mss.*), etc., it seems evident that the habit of preying upon Collembola is basic and widespread among the higher dacetine ants. *Strumigenys* and *Smithistruma* are the two largest genera in the tribe Dacetini, and form the bulk of the worldwide-distributed *Strumigenys* complex. The peculiar bizarre pilosity and spongi-form appendages of the pedicel and adjacent parts of the body displayed by the members of this complex are possibly connected with a secretory apparatus which may produce the granular substance so commonly fouling the surfaces of the integument. This apparatus may well act as a lure for Collembola, many of which feed upon fungi. Many of the hairs on dacetine species are good copies of hyphae, fruiting bodies, etc., and in view of the preference observed in many springtails for well-moulded insect remains, it may

be hypothesized that some collembolans are drawn toward the head and jaws of the dacetines by olfactory, tactual and possibly even visual lures in a few cases, although the eyes of *Collembola* are very poorly developed at best. It is certainly of some significance that the pilosity is usually most bizarrely developed on the clypeus, nearest the jaws, and that the ants are extremely sedentary huntresses compared to most predaceous ants which have been studied.

All of these possibilities require testing by experimentation. The greatest difficulty to be overcome lies in the extremely small size of the ants which have been investigated up to the present; larger species of *Strumigenys* like *mandibularis* Fred. Smith and *nidifex* Mann will probably prove better subjects for observation.

The almost instantaneous immobilization of the prey when struck by the dacetines may be due, as is suggested by the recorded observations of Creighton (1937), to some toxic principle employed by the ants at the time of striking. The curious paired labral lobes, appearing like small extended nozzles between the mandibular bases of all *Strumigenys* complex species, would probably be the best structures to investigate for solution of this problem.

Meanwhile, the observations of Mr. Wilson and some of my own made upon *Smithistruma rostrata* (Emery) strongly suggest the following generalization: collembolan species having well developed springing apparatus (furcula) are preferred as prey, while those in which the furcula is lacking or poorly developed are either rarely taken or rejected. When I flooded my colony, established in a small artificial nest, with several hundred live *Anurida maritima*, the common springless seaside collembolan, those individuals which entered the *rostrata* nest accidentally were forcibly ejected by the ants. Some were stung by the ants and killed, but none was eaten. Numerous specimens of *Onychiurus aruatus* Tullberg flourished on a heavily moulded substrate of beetle larvae remains, feeding voraciously on the white filamentous hyphal strands, but none were ever molested by any *Smithistruma* workers, even those which came into direct contact with them. In my observation nest, the *rostrata* workers preferred Entomobryidae (*sensu lato*) above all other types of *Collembola* offered them.

Mr. Wilson's observations upon *S. louisianae* wherein termites were taken require further attention, especially since so many tropical dacetines are taken often in termitaries. The possibility exists that many other groups of ants having bizarre mandibles or pilosity or both together may feed on *Collembola* or on some other fungiphilous arthropods (*Mystrium*, *Creightonidris*, *Octostruma*, *Calypptomyrax*, etc.).

I hope to investigate the three other major lines in the dacetines in addition to the *Strumigenys* complex. Some of the members of these more primitive lines are so large that observation of the means of foodgetting should prove easy. The feeding of *Orectognathus*, *Daceton* and members of the *Epopostruma* complex should show some indications of the mode of origin of the complex food relationship characteristic of the higher dacetines.

I wish to congratulate Mr. Wilson on his significant addition to the knowledge of dacetine ethology, and I know that work which he is now beginning with several genera will shed new light on the problem. I also wish to thank Mr. Kenneth Christiansen, who has determined all the collembolans and who has contributed in a major way to formulating ideas of prey selectivity here put forward. Credit is also due Lt. Joseph W. Jones, Jr., who has sent me the colony of *Smithistruma rostrata* mentioned above from north of Newport News, Virginia. I have had this colony under observation for over one year.

#### REFERENCES CITED

- Creighton, W. S. 1937. *Psyche*, XLIV, pp. 97-109, fig. 1.  
Weber, N. A. 1939. *Ann. Ent. Soc. Amer.*, XXXII, pp. 98-99.  
Wesson, L. G., Jr. 1936. *Ent. News*, XLVII, pp. 171-174.  
Wesson, L. G., Jr. and R. G. Wesson 1939. *Psyche*, XLVI, pp. 91-112, Pl. 3.
- 

**Two aphid records:** Interesting aphid records recently called to my attention by Professor M. A. Palmer when she examined some of my unidentified aphid slides, included: *Vacuna (Thelaxes) californica* Davidson, which I collected on *Quercus gambelii* above Thistle and at Castle Gate in Utah, June 9, 1946. A still more interesting find was a slide of *Panaphis (Callipterus) juglandis* (Goetz), collected by my former student, D. L. Bischoff, on walnut at Hazeldeh, Washington, July 5, 1945. G. F. KNOWLTON, Logan, Utah.

ON THE IDENTITY OF *THERINA FERVIDARIA*  
HÜBNER (LEPIDOPTERA, GEOMETRIDAE,  
ENNOMINAE).

By JOHN G. FRANCLEMONT, Arlington, Virginia.

In 1943 when Capps (Proc. U. S. Natl. Mus., vol. 93, p. 122) revised the American species formerly referred to *Therina* he was forced to regard *fervidaria* Hübner as a *species inquirendum* because he was unable to match Hübner's figures (Zuträge zur Sammlung exotischer Schmetterling, vol. 3, figs. 409, 410, [1827] with any of the material before him. Forbes (Lepidoptera of New York and Neighboring States, part 2, p. 101, 1948) suggested the possibility that *fervidaria* might be a form or race of *athasaria*.

During the early spring of 1949, I took, at light, a series of males and a single female of *Lambdina athasaria*. The female was kept alive and allowed to oviposit. During a period of four days she laid ten eggs. When the larvae hatched, they were given white oak. They grew very slowly and finally pupated in late June. I was surprised to see signs of developing moths within the pupae a little over a week later, and after another ten days the first moth emerged; within two weeks all the pupae had produced moths. These specimens were quite unlike the parent female and any of the males caught at the same time. They were browner, less flecked and with rather well defined lines edged with yellow. A comparison of these reared specimens, as well as a caught specimen, with Hübner's figures of *fervidaria* showed a good match, with but one exception, which I think must have been an error in coloring. The yellow accompanying the t.a. line is shown on the inner side, while in these specimens, and in all other species of *Lambdina* having yellow accompanying the t.a. and t.p. lines, it is on the outer sides of these lines. Thus I am sure that we are safe in identifying *fervidaria* Hübner with *athasaria* Walker, this latter name being relegated to the category of a race for the single brooded, paler northern form. In the southern part of its range where there are two broods, the "athasaria form" is darker and more strongly flecked than *athasaria* from New York, the type locality.



## SOME NEW COLLEMBOLA FROM UTAH AND IDAHO

By D. L. WRAY, Raleigh, N. C.

The forms described in this paper are from material sent to me for study by George F. Knowlton and S. C. Ma whom I wish to thank for their interest and copious collecting in this region. Type material is at present in my collection.

### ***Onychiurus magninus* n.sp. (figs. 1-5).**

Length up to 3 mm. White with lead-grayish tinge. Post-antennal organ (fig. 1) consists of 7 large, elongate tubercles. Antennae equal to head, the segments as: 20: 25: 30: 40. Organ of 3rd antennal segment (fig. 2) with 5 guard setae, five finely tuberculate papillae and a pair of smooth sense rods. Fourth antennal segment with olfactory hairs. Pseudocelli as follows: on each side of head: 4 in a row at base of antennal (fig. 3); none on posterior of head; on each side of body as: 0, 1, 1, 1, 1, 0, 2, 4, 0. Unguis (fig. 5) stout, curving, unarmed. Unguiculus unarmed, lamellate, extending in an unusual long curving filament almost to tip of unguis. Anal spines (fig. 4) slightly curved, stout, equal to hind unguis in length. Long curving setae at posterior end of body. Clothing in general of short curving setae with sparse longer ones. Integument rather heavily tuberculate.

This form is distinguished by the shape of the postantennal organ, which is of the *subtenuis* type, and also by the number and arrangement of the pseudocelli on head and body.

Type locality: Logan Canyon, Utah, Oct. 31, 1949, from birch leaves, G. F. Knowlton and S. C. Ma.

### ***Onychiurus mai* n.sp. (figs. 6-11).**

Length up to 1.5 mm. White. Postantennal organ (fig. 6) with two rows of nuclei-like bodies, surrounded by a mass of simple tubercles. Antennae shorter than head or as: 8: 10, the segments as: 12: 20: 20: 32. Organ of the third antennal segment (fig. 7) with 5 guard setae, 4 papillae, 2 small sense rods, and 2 large coarsely tuberculate sense clubs. Fourth antennal segment with numerous olfactory hairs. Pseudocelli as follows on each side: on head, 3 at base of antenna, 2 on posterior of head (fig. 8); on body as (fig. 10): prothorax 1, metathorax 2, metathorax 2, abdominal segments 2 through 4 with 2 (obliquely situated), abd. 5 with 3

(obliquely situated), and none on abd. 6. Lateral body ocelli present. One pseudocellus on each precoxal. Unguis (fig. 11) stout, curving, unarmed. Unguiculus unarmed, lamellate, extending in a curving filament to about two-thirds length of unguis. Anal spines 2 (fig. 9) shorter than hind unguis or as: 10: 13. Long curving setae at posterior end of body. Clothing of scattered long straight setae and sparse short setae.

The number and arrangement of ocelli on head and body distinguishes this species from closely related ones.

Type locality: Logan Canyon, Utah, Nov. 19, 1949, G. F. Knowlton and S. C. Ma.

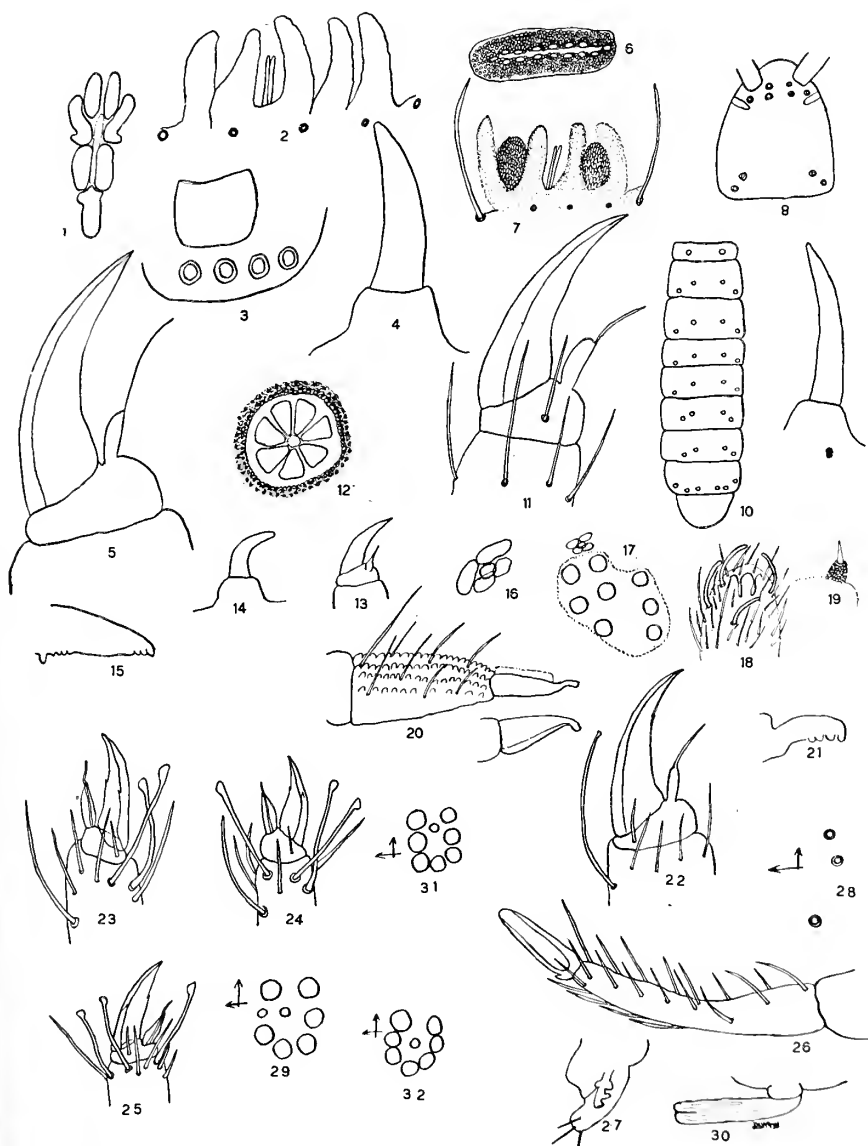
***Willemia vashtia* n.sp. (figs. 12-15).**

Color yellow (in alcohol). Length up to 0.6 mm. Eyes absent. Antennae somewhat shorter than head or as: 45: 50, length of the segments as: 10: 10: 14: 18. The 3rd and 4th antennal segment almost fused. The 4th with at least 4 olfactory hairs, and an apical retractile knob. Sense organ of 3rd antennal segment of 2 small sense rods behind a fold. Postantennal organ (fig. 12) consists of 7 tubercles in a pit. Mandible (fig. 15) with 2 to 3 apical teeth and a larger basal one. Unguis (fig. 13) small, curving, untoothed. Unguiculus small, spine-like, with an enlarged base, one-third as long as unguis. Tenent hairs absent. Furcula absent. Anal horns (fig. 14) 2, small, curving, about half as long as hind unguis. Body segments as: 10: 34: 40: 40: 35: 64: 25: 15;

---

EXPLANATION OF PLATE I

Plate I. *Onychiurus magninus* n. sp. FIG. 1. Postantennal organ. 2. Organ of 3rd antennal segment. 3. Pseudocelli at base of antennae. 4. Anal spines. 5. Hindifoot. *Onychiurus mai* n. sp. 6. Postantennal organ. 7. Organ of 3rd antennal segment. 8. Pseudocelli of head. 9. Anal Spines. 10. Pseudocelli of body. 11. Hind foot. *Willemia vashtia* n. sp. 12. Postantennal organ. 13. Unguis. 14. Anal horns. 15. Mandible. *Achorutes promatro* n. sp. 16. Postantennal organ. 17. Eyes. 18. Fourth antennal segment. 19. Anal spine. 20. Mucro-dens. 21. Tenaculum. 22. Hind foot. *Deuterosminthurus neopandus* n. sp. 23. Hind foot. 24. Middle foot. 25. Front foot. 26. Dens-mucro. 27. Tenaculum. 28. Bothriotrichia of side of abdomen. 29. Eyes. 30. Female and appendage. 31. Eyespot of *D. repandus* Agren. 32. Eyespot of *B. arvalis* (Fitch) (after Folsom).



the 4th being much longer than the others. Hairs sparse on first two segments of antennae but become numerous on 3rd and 4th segments. Setae sparse and short on head, thorax, and first 3 abdominal segments, but become numerous and longer on 4th to 6th segments, with those on 6th longer than all. Integument finely granulate.

This species is distinguished mainly by the 7 tubercles of the postantennal organ in a deep pit.

Type localities: Logan Canyon, Utah, Oct. 31, 1949, from birch leaves; Lakota, Utah, Nov. 19, 1949, from willow leaves; Garden City, Utah, Nov. 19, 1949, from willow leaves; all collected by G. F. Knowlton and S. C. Ma.

***Achorutes promatro* n.sp. (figs. 16-22).**

Length up to 1.0 mm. Light grayish to grayish-blue, sometimes grayish-red in color, speckled and spotted with reddish-purple round spots all over. Antennae shorter than head or as: 35: 40, with antennal segments as: 8: 8: 10: 12. Fourth segment with an inverted globular sense knob at apical end, and with several bent sense hairs (fig. 18). Eyes (fig. 17) eight on each side. Postantennal organ (fig. 16) with four tubercles and a central "Nebenhöcker", the two anterior tubercles somewhat larger than others. Body stout, somewhat spindale-shaped posteriorly. Unguis (fig. 22) rather stout, long, and with a weak tooth on inner margin about a third from apex. Unguiculus two-thirds as long as unguis, lanceolate and ending in a fine filament reaching to unguicular tooth. One long knobbed tenent hair, reaching as far as unguiculus. Manubrium to dentes to mucro as: 15: 12: 4. Dentes (fig. 20) stout, tapering slightly, with large dorsal tubercles and with about 7 dorsal setae. Mucro (fig. 20) triangular, tapering toward apex and with tip bent slightly downward, and with a small outer lamella. Anal spines (fig. 19) two, very small, almost straight, about one-fourth hind unguis in length. Clothing of sparse short, curving setae. Tenaculum (fig. 21) quadridentate.

This species is very near *A. maturus* Folsom, but differs in having large heavy dorsal tubercles dorsally on dentes, differences in post-antennal organ, mucro, and in having the inverted sense knob at apex of 4th antennal segment.

Type localities: Franklin, Idaho, Nov. 2, 1949, from Colorado blue spruce, G. F. Knowlton and S. C. Ma; Logan, Utah, Nov. 2, 1949, on ash tree (Almago), G. F. Knowlton and S. C. Ma.

***Deuterosminthurus neopandus* n.sp. (figs. 23-30).**

Length up to 1.5 mm. Color yellow with black eyespots and a black spot on front between eyes. Antennae yellow on first two segments, last two purplish. Legs lighter. Transverse depression behind middle of abdomen. Eyes (fig. 29) 8 on each side, the two median inner eyes smaller than others. Antennae longer than head, with lengths of segments as: 15: 30: 35: 82. Fourth antennal segment with 5 subsegments, besides the basal and apical segments, with a whorl of hairs on each annulation. With at least 3 bothriotrichia laterally on abdomen and one on anogenital segment. The lateral bothriotrichia (fig. 28) forming an angle, ventral one twice as far from median one than dorsal. Unguis (figs. 23-25) rather straight, with a pair of lateral teeth and one on inner margin two-thirds from apex. Unguiculus, lamellate, and with a filament at apex which extends at least two-thirds of unguis. Tenent hairs 2 or 3, varying from 2 on hind foot to 3 on mid and front foot. Mucro (fig. 26) spoon-shaped, to the dens as: 20: 60. Dens longer than manubrium with at least 2 rows of dorsal setae and with 4 appressed ventral setae. Anal appendage (fig. 30) blade-shaped, divided at apex. Tenaculum (fig. 27) tridentate, and with 3 setae on apical lobe.

This form is near *D. repandus* Agren. in color and general appearance and also to *Bourletiella arvalis* (Fitch) as to color pattern. However, as to the latter genus I have not been able to find any indications of dorsal hooks on anal segment and also the female anal appendage is entirely different, as well as, the eye pattern. Therefore, this form is placed in the group with *D. repandus*, from which it differs in averaging larger in size (comparing the cotypes with hundreds of *repandus*), differences in dens-mucro, eye pattern, and in other structures.

Type locality: Wellsville, Utah, May 17, 1949, on dandelion, Allan and S. C. Ma.

**Collembola in Northern Utah Celery Fields.**—During summer and fall of 1949, soil from around the roots of celery plants, normal celery plants themselves, and celery trimmings lying on the ground following harvest operations, were collected and samples of the contained Collembola secured by means of a small modified Berlese funnel. Collembola were present in every sample collected and at times were present in great numbers, particularly in decomposed plant trimmings and discarded plants. Identifications of the Collembola were made by D. L. Wray. This is one portion of a study being made for the Utah Agricultural Experiment Station on celery field insects.

*Achorutes armatus* Nic. was numerous on celery plants at Murray in May, and in celery plant waste at Honeyville during October.

*A. maturus* Fols. was climbing around on celery at Murray in May, and numerous in celery hearts and trimmings at American Fork, Honeyville, and Murray from August to October.

*A. pseudarmatus* Fols., in celery hearts at Midvale, October 14.

*Deuterosminthurus repandus* Agren. was rare on celery at Corinne, September 7.

*Folsomia functaris* Linn. A few among celery waste, Honeyville, October 4.

*Entomobrya marginata* Tullb. Very numerous among celery trimmings at Corinne, September 22.

*Guthriella antiqua* Folsom. On celery at Murray, May 31; from celery hearts, Midvale, October 14.

*Isotoma trispinata* MacG. Above ground on celery plants at Murray May 31; among celery trimmings at American Fork and Honeyville in August and October.

*Lepidocyrtus cyaneus cinereus* Folsom. Among celery trimmings at American Fork, September 19.

*Onychiurus armatus* Tullb. Among celery waste at American Fork in August, and at Corinne, October 4.

*Prisotoma aquae* Bacon. Among celery trimmings in a harvested celery field at Corinne, September 22.

*P. schotti* (D.T.). Very numerous and possibly injurious in celery field at Honeyville, October; American Fork, September 19.

*P. minuta* Tullb. Among celery waste at Honeyville, October 4.

*Pseudosinella violenta* Fols. Among celery trimmings at American Fork in September, and at Honeyville in October. G. F. KNOWLTON, S. C. MA, Logan, Utah and D. L. WRAY, Raleigh, North Carolina.

# BULLETIN

OF THE

## BROOKLYN ENTOMOLOGICAL SOCIETY

---

VOL. XLV

OCTOBER, 1950

No. 4

---

### RECORDS AND DESCRIPTIONS OF NEARCTIC CADDIS FLIES. PART 1.

By D. G. DENNING, Laramie, Wyoming

A recent study of several collections of Trichoptera seem to indicate that the Trichoptera fauna of nearctic North America is still quite inadequately known. Not only is the distribution of the majority of the described species poorly known, but also it is probable that many new species remain to be described. In this paper the writer presents the descriptions of five new species and synoptic notes on a few interesting but practically unknown species. Unless otherwise indicated types of the new species are in the writer's collection.

#### *Arctopsyche californica* Ling

1943. *Arctopsyche divergens* Banks. Bulletin Museum Comparative Zoology. P. 368, Figs. 75, 80. (NEW SYNONYMY).

*Arctopsyche californica* was described by Ling in 1938 from a single male collected in Shasta County, California. The description and figures of *divergens*, described from a male collected at Castella, California, agree very well with the type of *californica*. The figure of the male genitalia, fig. 1, was prepared from a male collected at Patricks Creek, a tributary of Smith River, Del Norte County, California, June 16, 1949, S. G. Jewett, Jr., to which the holotype of *californica* was compared and found identical except for a few minor variations. The short gradually divergent prongs of the tenth tergite, the pair of large dorsad curved spines arising from the ventral portion of the tenth tergite and the presence of a small pair of spines on the dorsal surface of the aedeagus will serve for a quick identification of the species.

I would like to express my thanks to Dr. Edward S. Ross of the

California Academy of Sciences who kindly loaned me the type of *californica*.

*Arctopsyche incermis* Banks

This species was described by Banks in 1943 from a series of specimens collected in Summit County, Colorado, at an elevation of 8211 feet. No additional distributional records have since then been recorded in the literature. Since there was some confusion regarding this species a study of a male paratype, kindly loaned to the writer by Dr. J. Bequaert of the Museum of Comparative Zoology, was made. On the basis of the convergent acuminate prongs of the tenth tergite, as shown in fig. 2, this species can readily be separated from *grandis* Banks its closest relative.

California: Santa Catalina Mts., August 7, 1939, (J. A. Comstock), 1 ♂ (Los Angeles County Museum Collection).

Montana: Cameron Bridge, West Gallatin River, Gallatin County, June 15, 1949, (S. L. Rowe), 10 ♂, 14 ♀. Mouth of Deer Creek, West Gallatin River, Gallatin County, June 24, 1949, (D. R. Orcutt), 46 ♂, 5 ♀. (Montana State College collection).

Oregon: Willamette River, near Oakridge, June 27, 1948, (D. G. Denning), 10 ♂.

Utah: Hanna, July 4, 1949, (J. R. White), 4 ♂. (University of Kansas Collection).

***Wormaldia thyria* n. sp.**

Male.—Length 6–6.5 mm. General color of wings fuscous, appendages yellowish. Front and hind wings both with  $R_{2+3}$  branched and  $M_{3+4}$  unbranched. Seventh abdominal sternite with apical margin produced into a broad triangular process, fig. 3A, eighth sternite produced into a short triangular process. Genitalia as in figure 3. Ninth segment annular, caudal margin produced cephalad as a bluntly rounded projection partially covered by the eighth sternum and tergum. Tenth tergite tapering to a triangular apex, undivided, devoid of setae, fig. 3B. Cerci elongate, slender, setation sparse, fig. 3B as long as tenth tergite, apex blunt. Basal segment equal in length to apical segment, dorsal margin broadly rounded; apical segment constricted beyond base, apex circular, setae rather dense, apex bears a pad of dense reddish spicules on mesal surface.

Holotype.—Male; Neels Creek, Mt. Mitchell, North Carolina, Game Refuge; May 30, 1949; (J. F. Hanson).



Paratype.—1 ♂; Same data as for holotype. Deposited in the collection of the University of Massachusetts.

Ross (1949) separated the nearctic species of *Wormaldia* into three groups based on the male genitalia. Accordingly, *thyria* would then be placed in the *Moesta* group which Ross further divided into three subgroups based on the mesal projection of the seventh sternite. *Thyria* belongs in the third subgroup, along with *strola*, *sisko*, *occidea* and *shawnee*; it is most closely related to the latter two species.

### ***Nyctiophylax zelenus* n. sp.**

This represents the fourth species in the genus to be described from the United States. It can easily be distinguished from *vestitus* (Hagen), *uncus* Ross and *celta* Denning by the large apico-mesal lobe and the absence of a lateral lobe on the clasper, fig. 4A.

Male.—Length 7 mm. Wings light brown, antennae, palpi, legs and spurs light yellow. General characteristics typical of genus. Male genitalia as in fig. 4. Tenth tergite very lightly sclerotized, apical margin incised, forming a pair of short setiferous points. Cerci quadrate, apical margin very irregular in outline; ventro-mesal portion projected ventro-caudad as a prominent heavily sclerotized process, its apex acute and distinctly hooked. Clasper, seen from lateral aspect, with base rounded, posterior surface deeply concave, apex narrowed into a single dorsad curved lobe; seen from caudal view, fig. 4A, mesal lobe large, subtriangular. Aedeagus light brown, somewhat tubular, apex broadly ovate, dorsal rods heavily sclerotized, acuminate, projecting caudad slightly beyond cerci but not beyond aedeagus as in *vestitus*.

Holotype.—Male; Rio Frio River, Concan, Uvalde County Texas; April 14, 1949; (R. H. Beamer). Deposited in the University of Kansas collection.

### *Nyctiophylax vestitus* (Hagen)

Since *vestitus* has not been recorded in the western part of the United States the following records are of interest.

Wyoming: Sheridan, June 20, 1947 (D. G. Denning), July 24, 1948 (D. G. Denning); Buffalo, July 30, 1948 (R. E. Pfadt); Platte County, Laramie River, August 1–12, 1949, light trap.

British Columbia; Cowichan Lake, August, 1940, (C. P. Idyll).

***Polycentropus gertschi* n. sp.**

The presence of the triangular projection on the mesal surface of the claspers, the narrow elongate cerci, and the scoop-like acuminate ventral sheath of the aedeagus will readily distinguish *gertschi* from other described species in the genus.

Male.—Length 8 mm. Both pairs of wings light brown, dorsal portion of head and thorax brownish, ventral portion of each, legs, spurs, palpi and antennae light yellow; eyes black. General characteristics typical for genus. Male genitalia as in fig. 5. Sternite and tergite of eighth segment unmodified. Ninth sternite about twice as wide as long; ninth tergite membranous. Tenth tergite membranous, extending caudad beyond cerci; from dorsal aspect appears broadly ovate, flanked on each side by a pair of slender finger-like processes extending caudad nearly as far as claspers, apex bearing several long, fine setae. Cerci elongate, narrow; dorsal portion extending caudad as an ovate process; ventral portion narrowed to an acute ventrad directed apex. Claspers, when seen from the lateral aspect, sub-quadrate, dorsal margin rounded, ventral margin nearly straight, projecting beyond remainder as a hook; from caudal aspect, fig. 5A, mesal margin produced into a prominent, mesad directed, triangular point. Ventral sheath of aedeagus projected ventrocaudad as a gradually narrowed acute projection. Aedeagus tubular; internally three pairs prominent spines grouped together near apex, two pairs of heavily sclerotized spines near base.

I take great pleasure in naming this new species in honor of the collector, Dr. Willis J. Gertsch of the American Museum of Natural History.

Holotype.—Male; Oak Creek Canyon, Arizona; July 22, 1949; (W. J. Gertsch). Deposited in the collection of the American Museum of Natural History.

***Chimarra primula* n. sp.**

This species bears little resemblance to other described species, it can easily be identified by the claspers which are approximately in the shape of a parallelogram.

Male.—Length 8 mm. Color of wings and body dark brown, appendages a trifle lighter in color. General characteristics typical for genus. Genitalia as in fig. 6. Ninth segment with ventral portion wide and bearing a very short mesal projection; dorsal portion greatly reduced, fused to near base of tenth tergite. Tenth

tergite divided into a pair of lateral lobes; seen from lateral aspect, fig. 6, apical margin truncate, a short acute dorsal angulation near apex; seen from dorsal aspect, fig. 6*A*, lateral lobes gradually convergent, widened apically, apical margin straight, a short acute point near apex on lateral margin; mesal lobe membranous, triangular. Cerci small, sub-ovate, clothed with a few scattered setae. Claspers considerably longer than wide, ventral and dorsal margins almost straight, nearly parallel, apical margin rounded; from dorsal aspect, fig. 6*B*, a prominent short quadrate process arises near base and projects mesad; seen from ventral aspect a short blunt dorsad directed process arises from mesal margin near base. Aedeagus long, tubular; internally two long straight heavily sclerotized rods are plainly discernible.

Female.—Length 9 mm. Color and general structure similar to male. Genitalia apparently indistinguishable from others in the genus.

Holotype.—Male; Oak Creek Canyon, Arizona; June 19, 1949; (D. G. Denning).

Allotype.—Female; same data as for holotype.

Paratypes.—1 ♂, 4 ♀; same data as for holotype.

### ***Chimarra beameri* n. sp.**

The acuminate apex of the clasper when seen from the dorsal or ventral aspect, the abruptly narrowed apex of the clasper when seen from the lateral aspect, and the peculiar tenth tergite bearing two acute triangular tubercles will easily distinguish this species from others in the genus.

Male.—Length 6 mm. Wings, body, head and antennae fulvous, appendages luteous, spurs fuscous, outer claw of front leg very large, about two and one half times length of inner. Genitalia as in fig. 7. Ventral portion of ninth sternum wide, partially covered by eighth sternum, mesal process short, broadly rounded; apical margin nearly straight. Lateral lobes of tenth tergite extend slightly beyond aedeagus, seen from lateral aspect, fig. 7, apical margin tapering to a sub-acute apex, two short tubercles bearing a short spine-like seta are discernible on dorsal surface; seen from dorsal aspect, fig. 7*A*, lateral margin with a prominent angulation about midway and another near apex, one pair of short tubercles located about midway between base and apex. Cerci auricular, setae sparse. Claspers with base narrow, apico-ventral corner broadly rounded; dorsal portion abruptly narrowed to an acute

apex, entire structure curved mesad; from ventral aspect, fig. 7B, rounded condition of clasper and acute apex plainly discernible, mesal surface near base bears a pair of short tubercles each bearing a long seta. Aedeagus long, tubular, bearing a pair of long slender black rods internally.

I take great pleasure in naming this new species in honor of the collector, Dr. R. H. Beamer of the University of Kansas.

Holotype.—Male; Rio Frio River, Concan, Uvalde County Texas; April 14, 1949; (R. H. Beamer). Deposited in the University of Kansas collection.

*Chimarra moselyi* Denning

1948. *Chimarra perigua* Ross. New Nearctic Rhyacophilidae and Philopotomidae (Trichoptera). P. 24, Figs. 7, 7A. (New Synonymy).

Records given for *moselyi* and *perigua* indicate that *moselyi* is quite widespread in southeastern United States, extending north to Illinois.

REFERENCES

**Banks, Nathan**, 1943. Notes and Descriptions of Nearctic Trichoptera. Bull. Museum Comp. Zoology. XCII: 341-369. 138 figs.

EXPLANATION OF PLATE II

FIG. 1. *Arctopsyche californica*, male genitalia, lateral aspect, 1A, tenth tergite, dorsal aspect.

FIG. 2. *Arctopsyche incrimis*, male genitalia, lateral aspect; 2A, tenth tergite, dorsal aspect.

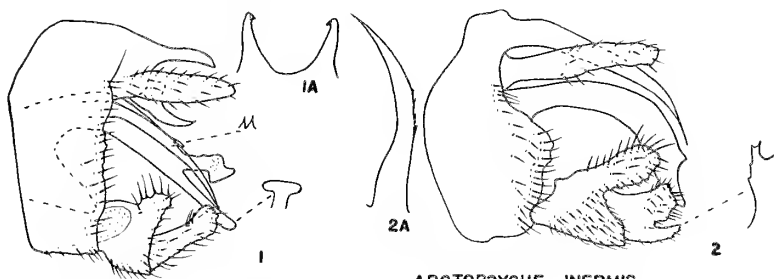
FIG. 3. *Wormaldia thyria*, male genitalia, lateral aspect; 3B, tenth tergite, dorsal aspect.

FIG. 4. *Nyctiophylax zelenus*, male genitalia, lateral aspect; 4A, clasper, caudal aspect.

FIG. 5. *Polycentropus gertschi*, male genitalia, lateral aspect; 5A, clasper, caudal aspect.

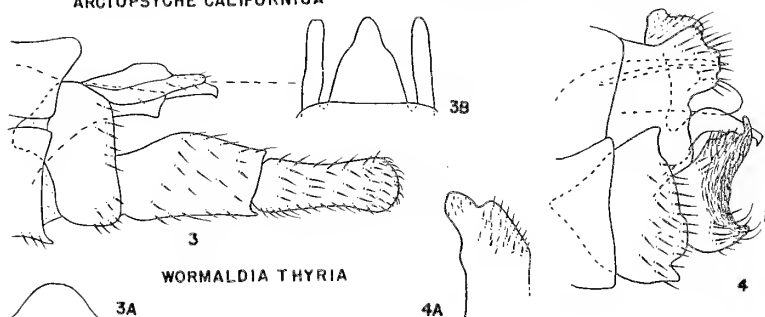
FIG. 6. *Chimarra primula*, male genitalia, lateral aspect; 6A, tenth tergite, dorsal aspect; 6B, base of clasper, dorsal aspect.

FIG. 7. *Chimarra beameri*, male genitalia, lateral aspect; 7A, tenth tergite, dorsal aspect; 7B, clasper, ventral aspect.



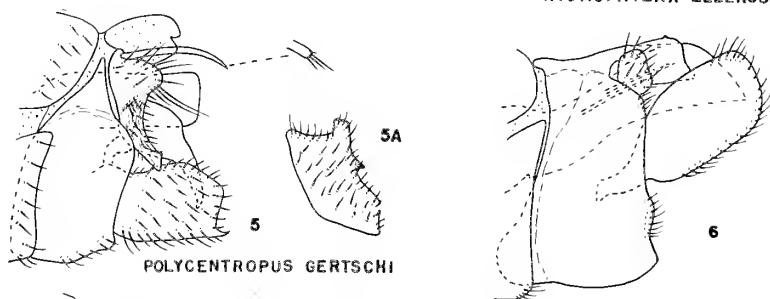
ARCTOPSYCHE CALIFORNICA

ARCTOPSYCHE INERMIS

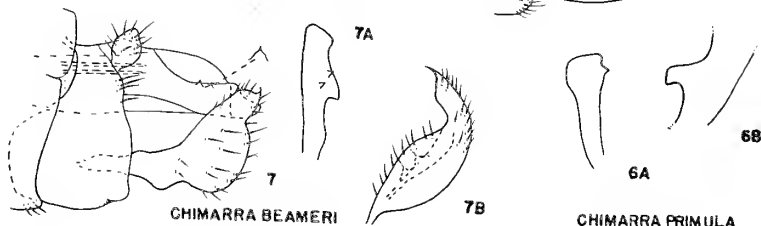


WORMALDIA THYRIA

NYCTIOPHYLAX ZELENUS



POLYCENTROPUS GERTSCHI



CHIMARRA BEAMERI

CHIMARRA PRIMULA

- Denning, D. G., 1947. New Species of Trichoptera from the United States. Ent. News. LVIII. 249-257. 10 figs.
- Ling, Shao-Win, 1938. A few Caddis flies in the collection of the California Academy of Sciences. Pan-Pacific Ent. XIV: 59-69.
- Ross, H. H., 1948. New Nearctic Rhyacophilidae and Philopotamidae (Trichoptera). Ent. Soc. Amer. Ann. XLI: 17-26. 8 figs.
- , 1949. A Classification for the Nearctic Species of Wormaldia and Dolophilodes (Trichoptera, Philopotamidae). Ent. Soc. Wash. Proc. 51: 154-160. 4 figs.
- 

**A Nemestrinid Bred from a Grasshopper in the United States.** Although the larvae of most, if not all, Nemestrinidae appear to be parasitic in Orthoptera, there are as yet few published records of specimens actually bred from the host. G. J. Spencer (1945), in British Columbia, obtained *Necorhynchocephalus sackenii* (Williston) from *Melanoplus m. mexicanus*, and *Trichopsidea (Parasymnictus) clausa* (Osten Sacken) from *Cannula pellucida* and "other grasshoppers." Professor D. G. Denning now sends me a female *T. clausa*, bearing a notation that it was reared on January 2, 1942, by R. D. Pfadt, from *Metator pardalinus* (Saussure), collected at Manville, Wyoming. This is the first specimen bred in the United States that has come to my notice, although there may be unpublished cases in certain files.—J. BEQUAERT, Museum of Comparative Zoölogy, Cambridge, Mass.

THE GENERA *BALDULUS* AND *DALBULUS* IN  
NORTH AMERICA INCLUDING MEXICO.  
(HOMOPTERA: CICADELLIDAE).

By DWIGHT M. DELONG, Columbus, Ohio.

With constantly increasing knowledge of biological relationships it is becoming evident that many species of leafhoppers belonging to several genera are vectors of organisms which cause plant diseases. Certain species of *Baldulus* and allied genera are included in this group of vectors and one or more of the species which are being described at this time are apparently concerned with and may be important as vectors of organisms causing plant diseases on corn and other plants in Mexico.

The genus *Baldulus* was described by Oman<sup>1</sup> to include the genotype *montanus* Oman and *elimatus* (Ball). Also *maidis* (DeLong) was later placed in this genus. The genus is similar in venation to *Macrosteles*, *Balclutha* and *Cicadulina*. Oman states in his original description, "Face elongate, triangular, margin of genae slightly sinuate below the eyes. Vertex triangularly produced and rounding to the front, median length slightly less than length of pronotum. Head including eyes equal to pronotum in width. Elytra elongate and slender with two antepical and four apical cells and distinct appendices. Wings with three apical cells."

The nine species which apparently belong to this general group and which are being treated at this time seem to represent two rather distinct groups which are here considered as *Baldulus* and a new genus *Dalbulus*. The genus *Baldulus* is represented by the type species *montanus* Oman and a closely related species described below as *bilineatus*, both of which have the long triangular vertex, almost as long as wide, which is conical in shape. The male aedeagus in both is elongate with a straight narrow shaft which is elbowed at the base so as to form a long narrow dorsal portion and the caudal tip bears rather long narrow apical processes. There are no pygofer spines and the ventral pygofer margin is not heavily sclerotized. A third species, *tropicus*, which is represented by the female only is placed here as it resembles *bilineatus*.

*Dalbulus* n. gen.

This genus is represented by *elimatus* (Ball), *maidis* (DeL. + Wol.) and four species being described at this time: *guerrai*, *longulus*,

<sup>1</sup> Proc. Ent. Soc. Wash. 36: 79. 1934.

*gelbus* and *acus*. The genus *Dalbulus* is characterized by species with bluntly rounded heads, scarcely angled and which are thick on their margins with the front. The vertex is decidedly wider than long. The male aedeagus is dorso-ventrally broadened with a long, laterally flattened baso-ventral portion which extends down between the styles. There is no dorsal basal portion and the apical processes are formed by notched or sloping portions of the apical part of the aedeagus shaft. The basal margin of the pygofer on each side is heavily sclerotized and appears as a broad spine-like process which extends beyond the remainder of the pygofer at the apex and the caudal margin of the pygofer slopes ventrally and caudally to the spine-like portion. A pair of forcep-like caudal spines are located on the dorso-caudal margin of the pygofer. The female seventh sternite is produced and very strongly produced and spatulate in the typical species.

Type of genus: *Deltocephalus climatus* Ball.

The types of all the new species described below are in the author's collection unless otherwise designated.

#### KEY TO GENERA

1. Vertex angled, about as long as median width at base between the eyes, color pattern on vertex and pronotum longitudinal in type, spots triangular; male aedeagus elongate, narrow, upturned at base and with apical processes caudally. Female seventh sternite emarginate . . . . . *Balbulus*
- Vertex produced and rounded or blunt at apex, distinctly wider between eyes at base than median length; paired spots on vertex rounded or broadened. Male aedeagus not upturned at base. Female seventh sternite produced and truncate, notched or spatulate . . . . . *Dalbulus*

#### KEY TO SPECIES OF *Balbulus*

1. Female seventh sternite broadly excavated with a small sunken tooth at middle; male unknown. (Known from Mexico only) . . . . . *tropicus*
- Female seventh sternite almost truncate without median tooth 2
2. One pair of apical processes of male aedeagus forked near base; female segment truncate—occurs in mountains of Arizona. . . . . *montanus*
- Neither pair of apical processes of male aedeagus forked; female segment broadly, shallowly excavated on median half. (Known only from Mexico) . . . . . *bilineatus*



KEY TO SPECIES OF *Baldulus*

1. Male aedeagus with three terminal processes separated near base, a shorter ventral process and two lateral dorsal processes. Styles narrow elongate. Female sternite produced and truncate apically ..... *acus*  
 Male aedeagus composed of one piece. Styles shorter and broader at base. Female sternite not truncate at apex . . . 2
2. Aedeagus deeply notched or excavated at apex to form apical processes. Female sternite produced and spatulate . . . 3  
 Aedeagus not deeply notched, sloping to ventral apex. Female sternite not spatulate ..... 5
3. Aedeagus notch forming a broad, dorsal truncated portion, filamentous apical portion single. Female sternite with a long, narrow, tapered spatulate posterior margin ..... *clinatus*  
 Aedeagus notch forming a caudo-dorsal thumb-like process; filamentous apical portion composed of two processes on each side. Female sternite more broadened and rounded near base ..... 4
4. Notch deep, thumb-like process long. Female sternite with a long and broad spatulate-like posterior margin . . . *guevarai*  
 Notch more shallow, thumb-like process short, more rounded. Female sternite broad and short, produced posterior margin bluntly pointed ..... *longulus*
5. Aedeagus rather narrow in lateral view with a median dorsally produced process. In ventral view with two divergent processes at apex. Female sternite with posterior margin produced and narrowly, rather shallowly excavated at middle ..... *maidis*  
 Aedeagus in lateral view broadened at base and again just before apex. Apex with an inner pair of short teeth and an outer pair of longer spines (ventral view). Female not known ..... *gelbus*

*Baldulus montanus* Oman

*Baldulus montanus* Oman. Proc. Ent. Soc. Wash. 36: 79, 1934.

A small species with a bluntly pointed apex and marked with black elongate spots. Length 3.25 to 3.5 mm.

Vertex as long or slightly longer than basal width between eyes, produced, bluntly pointed and conical.

Color: Pale yellow; vertex with a small brownish spot at apex, a large black triangular spot above and a little anterior to each

ocellus, a brownish quadrangular spot on the posterior margin next each eye and a faint brownish pair between these. Pronotum and scutellum with a rather broad, median, creamy stripe on each side of which are longitudinal brownish vittae. Veins of elytra and commissural line to apex of clavus white, cells embrowned.

Genitalia: Female seventh sternite with the posterior margin truncate or slightly sinuate. Male plates triangular; the apices forming narrow projecting and diverging processes. Aedeagus with shaft long and with a long basal portion bent dorsally and caudally. Apex curved upward with two pairs of processes at tip. One pair is long, slender and extending anteriorly along the shaft. The other pair is forked near the base, curved upwardly then anteriorly. The posterior branch is short; the anterior fork is longer.

This species was described from the Santa Rita Mts., Arizona, and has not been reported for other states.

*Baldulus bilincatus* n. sp.

Resembling *montanus* in form, appearance, coloration and type of male genitalia, but specifically distinct. Length 4 mm.

Vertex produced and conically pointed, almost as long at middle as basal width between the eyes.

Color: Pale brownish with a broad, white longitudinal stripe extending from the apex of the vertex to the apex of the scutellum. There is an elongate triangular black spot on either side at apex of vertex and a small elongate black spot on inner margin of each eye. Pronotum with elongate brown lines and stripes, the outer portions paler. Elytra pale brownish, veins pale. Dark fuscous areas in base or apex of cells on the disc. Face brownish with a pair of transverse dark marks just beneath margin, a round black spot just anterior to each eye and a series of dark arcs on lower portion of face.

Genitalia: Female seventh sternite almost truncate with indication of two median blunt teeth separated by a notch. The male aedeagus is curved, in lateral view, with a long dorsally directed basal portion and with four apical processes. The two ventral processes are longer and are bent anteriorly and ventrally. The styles are rather short, broadened at base and narrowed at apex to form a curved spine which is pointed apically and curves outwardly. The plates are short, decidedly exceeded in length by the pygofer.

Holotype male and paratype males from Zitacuaro, Mich., Mexico, October 5, 1941, collected by Plummer, Good, Caldwell and

DeLong. Paratype males from Carapan, Mich., October 2, 1941 by the same collectors. Allotype female and male paratypes taken at Laguna de Zempoala, Mor., October 21, 1945 by Plummer, DeLong, Hershberger and Elliott. Male paratype from Rio Frio, D. F., October 10, 1945 and from Desierto de Los Leones, D. F., Mexico, October 9, 1945 collected by DeLong, Hershberger and Elliott. Paratype male from Cuernavaca, Mor., October 21, 1941 by DeLong, Good, Caldwell and Plummer.

***Baldulus tropicus* n. sp.**

Resembling *bilineatus* in general appearance but with a blunter head, color marking different and with different female seventh sternite. Length, female 4.5 mm.

Vertex produced and bluntly angled, a little wider between eyes at base than median length. Pronotum about one and one-half times as long as vertex.

Color: Vertex, pronotum and scutellum pale brownish with a broad white longitudinal stripe extending from apex of vertex to apex of scutellum. Vertex with a large round black spot each side of white stripe and just above margin. A black quadrate spot along each eye at base. Pronotum with indications of longitudinal darker brown stripes on each side of white stripe. Elytra pale brownish subhyaline, unmarked, veins white. Face and beneath pale yellow. Female seventh sternite black margined on median portion of posterior margin.

Genitalia: Female seventh sternite with well produced lateral angles between which the posterior margin is distinctly but rather shallowly excavated to form a median small sunken tooth.

Holotype female collected at Tamazunchale, S. L. P., Mexico, November 2, 1945, from the herbaceous growth in a tropical wooded area by DeLong, Hershberger and Elliott. This species is described from a single female specimen as it seems to represent a tropical species of this group. The other Mexican species belonging to this genus and described at this time as *bilineatus* has not been taken at elevations below 6,000 feet and for the most part at elevations of 9,000 to 10,000 feet. They occur in forests of pine or fir. The species here designated as *tropicus* was taken at 500 feet elevation in the tropical deciduous forest.

*Dalbulus climatus* (Ball)

*Deltocephalus climatus* Ball. Can. Ent. 32: 345. 1900.

A blunt headed brownish species with two large black spots on anterior portion of vertex. Length 4 mm.

Vertex bluntly produced, scarcely angled, almost twice as wide between eyes at base as median length.

Color: Dull yellow with faint or heavy brownish longitudinal vittae on vertex and pronotum. Vertex with a large ovate black spot on each side just above margin and next the eye. There is a small fuscous spot at apex. Elytra appearing pale brownish with pale veins. Face pale brownish, a small black spot just beneath each ocellus.

Genitalia: Female seventh sternite narrowed near base, then convexly rounded and produced as a bluntly rounded spatulate process extending more than half the length of the pygofer. Male plates long, tapered, with acutely pointed apices, extending decidedly beyond the pygofer. The aedeagus is rather broad with a basal broad leaf-like process on ventral side extending between the apices of the styles. The apex is tapered to form a long, slender, sharply pointed process which is separated from a median dorsal, broadly truncated portion by a deeply rounded notch.

This species was described from specimens from Mexico. It is an abundant species in many regions of Mexico. Specimens at hand are from San Jacinto, D. F., Mexico, September and October, 1933, Tlalpan, D. F., September 16, 1923, Xochimilco, D. F., September 20, 1923 and Mexico City, September 20, 1923—all collected by A. Dampf. Guadalajara, Jalisco, Mexico; Santa Rosa, Pue., July 23, 1927 (Dampf); Zitacuara, Mich., September 29, 1941; Uruapan, Mich., October 1, 1941; Zacapu, Mich., October 4, 1941; Tuxpan, Mich., October 5, 1941; Rio Frio, D. F., October 7, 1941; Pueblo, Pue., October 18, 1941; La Guarda, D. F., October 26, 1941 and Tehuacan, Pue., October 17, 1941—all collected by Good, Caldwell, Plummer and DeLong.

#### ***Dalbulus guevarai* n. sp.**

Resembling *climatus* in form and general appearance but with distinct male genitalia. Length 4 mm.

Vertex blunt and rounded, about one-third wider between eyes at base than median length.

Color: Pale yellowish, vertex with a pair of black spots just above margin of vertex, one next either eye. Elytra whitish subhyaline.

Genitalia: Female seventh sternite rather broad at base, gradually roundly produced and tapered to form a blunt apex at about

one-third the length of the pygofer. Male aedeagus with a broad flattened antero-ventral portion which extends down between the styles. The apical portion is composed of a thumb-like dorsal process and a long, slender, curved finger-like ventral process which extends caudally and curves dorsally at apex. A short finger-like process arises just ventrally at the base of the long ventral process. The styles are short with apex truncate, the outer margin extending laterally. The plates are long and narrow extending to apex of pygofer. The ventral margin of the pygofer is heavily sclerotized and curled under and extends to the apex.

Holotype male, allotype female and male and female paratypes collected at Iguala, Gro., Mexico, September 11, 1939, by DeLong and Plummer and October 22, 1941, by Good and DeLong. Paratypes are also at hand from Navajoa, Son., Mexico, July 16, 1927 (Dampf) and Taxco, Gro., October 24, 1941, by Caldwell, Good DeLong and Plummer. Holotype, allotype and paratypes in the author's collection; paratypes in the U. S. National Museum collection.

I take pleasure in naming this species for Mr. Jose Guevara whose studies have helped to increase our knowledge of the leaf-hopper fauna of Mexico.

#### ***Dalbulus longulus* n. sp.**

Resembling *maidis* in form and coloration but with distinct genitalia. Length 3.5 mm.

Vertex short, broad, rounded, almost three-fourths as long as middle as basal width between the eyes.

Color: Pale yellowish with a pair of black spots above margin, one next each eye. Pronotum slightly darker; elytra whitish subhyaline.

Genitalia: Male plates elongate, pointed, almost as long as pygofer. Aedeagus broadened at base in lateral view by a broad, flat process which extends ventrally between the apices of the styles. Apical portion with a short, blunt thumb-like process dorsally and a pair of elongate, slender ventral processes on each side. The dorsal process is twice as long as the ventral process and curves dorsally. The pygofer is thickened at the base and curled so as to appear as a separate process.

Holotype male and paratype males collected at Tamazunchale, S. L. P., Mexico, September 20, 1945 by DeLong, Hershberger and Elliott. Paratype males, same locality, August 29, 1939 by F. M. and D. M. DeLong. Female allotype and male and female paratypes from Tamazunchale, September 25, 1941 and male and

female paratypes from Valles, S. L. P., September 24, 1941 collected by DeLong, Caldwell and Good.

***Dalbulus acus* n. sp.**

Resembling *elimatus* in coloration and general appearance but with distinct male genitalia. Length 5 mm.

Vertex produced, blunt at apex, a little wider between eyes at base than median length.

Color: Pale brownish with apex white and longitudinal white stripe extending from apex of vertex to apex of scutellum. There is a minute black spot at apex and a larger black spot each side between apex and eyes just above margin. The outer portion of the pronotum is paler, thus giving the appearance of a rather broad brownish stripe extending from the large spots on vertex to the basal angles of scutellum. Elytra pale brownish with paler veins, appearing striped longitudinally. Face pale brownish.

Genitalia: Female seventh sternite broadly, shallowly excavated on posterior margin. Male aedeagus composed of three slender apical processes. The central process is more slender, shorter and more ventral in position than the two dorsal processes which are broadened, in lateral view, just before the pointed apex. The styles are long, rather narrow, the apex forming an outwardly curved spine. The aedeagus connective is about two-thirds as long as the aedeagus. The plates are three-fourths as long as the pygofer.

Holotype male, Mexico City, D. F., September 18, 1939, collected by D. M. LeLong. The allotype female was collected near Mexico City in February, 1933, by A. Dampf.

*Dalbulus maidis* (DeLong & Wolcott)

*Cicadula maidis* DeLong & Wolcott. Jour. Dept. of Agr., Porto Rico 7: 265, 1923.

A pale, blunt-headed species with two separated black spots on anterior portion of vertex. Length 4 mm.

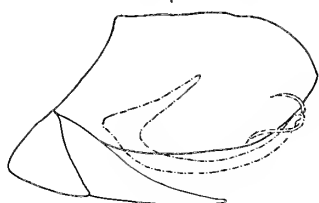
Vertex rather broadly, roundedly produced, about one-third wider between eyes than median length.

---

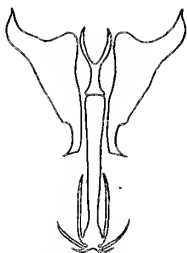
EXPLANATION OF PLATE III

Above—lateral and ventral views of male genital structures for *B. bilincatus*, *B. montanus*, and *D. acus*.

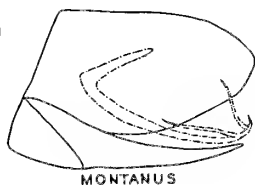
Below—ventral views, tip of abdomens of females showing seventh sternite and produced posterior margin.



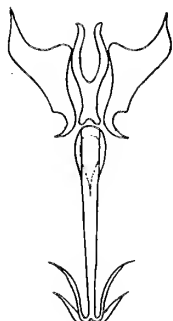
BILINEATUS



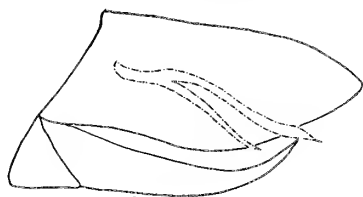
MONTANUS



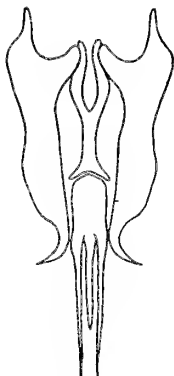
MONTANUS



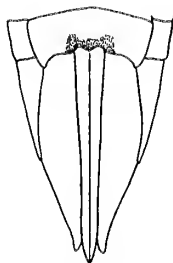
BILINEATUS



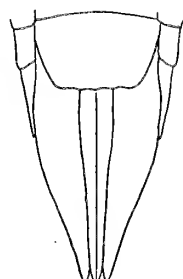
ACUS



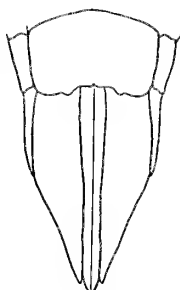
ACUS



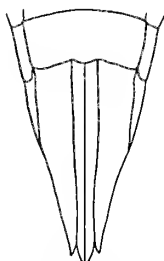
TROPICUS



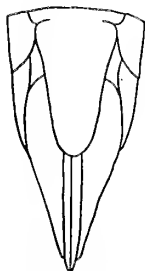
ACUS



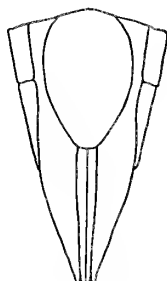
BILINEATUS



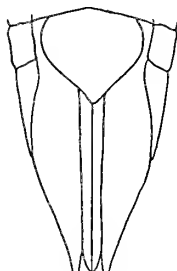
MONTANUS



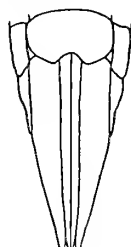
ELIMATUS



GUEVARAI



LONGULUS



MAIDIS

Color: Same shade of yellow or greenish yellow; vertex with a pair of large, round, black spots, one behind each ocellus and close to either eye. Elytra yellowish subhyaline; veins lighter.

Genitalia: Female seventh sternite with posterior margin slightly produced on either side of a broad, rather shallow, median V-shaped notch which is slightly embrowned. Male plates elongate, triangular with narrow, sharp-pointed apices about two-thirds as long as pygofer. The aedeagus is elongate and rather slender. The apex is composed of a pair of divergent processes which curve outwardly, caudally and are sharp-pointed at the apex. In lateral view the apical half is a little broader with apical spines extending antero-ventrally and postero-dorsally. A short, blunt, dorsal process occurs at the median curved portion.

Originally described from Puerto Rico this insect has been recorded from Arizona, California, Texas, Florida and North Carolina in the United States. It is also recorded from Peru, Argentina, Costa Rica, Cuba, Brazil, Venezuela and Mexico. In Mexico other related species have undoubtedly been identified as *maidis*. Records at hand from Mexico are from Iguala, Gro., September 11, 1939, Chilpancingo, Gro., October 25, 1941 collected by Good, Plummer and DeLong; Zincaura, Gro., September 2, 1930 by J. Parra; Esperanza, Chia., August 2, 1938, Huiztla, Chia., September 4, 1932 and Petocale, Q. Roo, August 21, 1925 collected by A. Dampf; San Rosa, Pue., July 23, 1927 by Dampf; Tamazunchale, September 25, 1941, Valles, S.L.P., September 25, 1941 and Saltillo, Coah., September 23, 1941 collected by DeLong, Caldwell and Good.

### ***Dalbulus gelbus* n. sp.**

Resembling *maidis* in form, coloration and general appearance but with distinct male genitalia. Length 4 mm.

Vertex short, blunt, rounded, a little more than half as long as middle as basal width between the eyes.

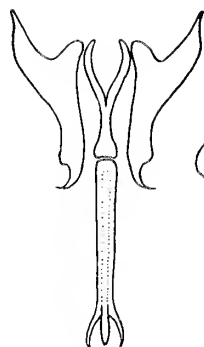
Color: Pale yellow or cream with a pair of rather large black spots just back of margin on vertex, one rather close each eye. Elytra whitish subhyaline.

---

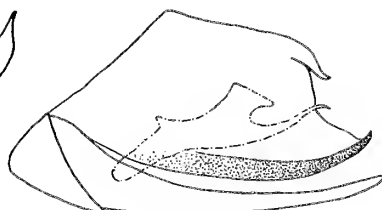
### EXPLANATION OF PLATE IV

Lateral and ventral views of male genitalia of species of *Dalbulus* as labeled.

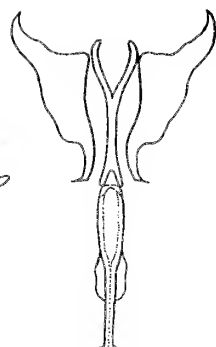




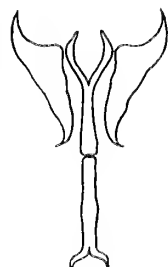
GELBUS



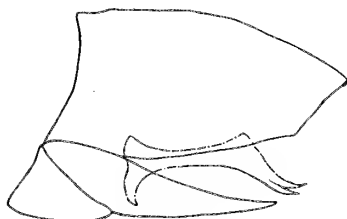
ELIMATUS



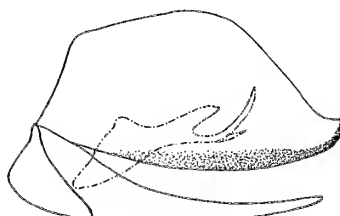
ELIMATUS



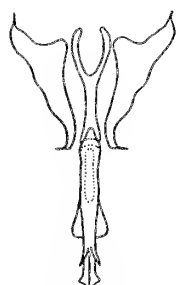
MAIDIS



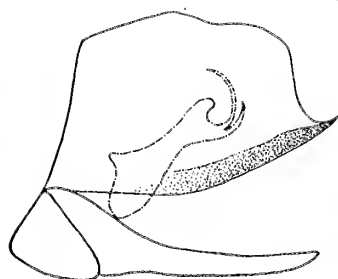
GELBUS



GUEVARAI



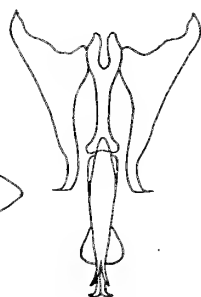
GUEVARAI



LONGULUS



MAIDIS



LONGULUS

**Genitalia:** The male plates are about two-thirds the length of the pygofer. The styles are elongate with narrow apices composed of pointed spine-like outwardly curved tips. The aedeagus in lateral view is broadened at the base. The apical portion is also broadened then sloping to a ventrally caudally pointed apex. In ventral view the apex is composed of a pair of short pointed median processes and a pair of outer longer slender divergent processes.

Holotype male and paratype males collected at Iguala, Gro., Mexico, September 11, 1939 by D. M. DeLong and C. C. Plummer. Male paratypes from Tepotzlan, Mor., Mexico, September 11, 1941 by Plummer, Good, Caldwell and DeLong.

**Abnormality in *Corydalus* (Megaloptera).** This note records an abnormality in the left mesothoracic leg of *Corydalus cornutus* (L.). The legs of this species are of the normal type with five-segmented tarsi terminating in double claws. Measurements (in millimeters) of a normal and the abnormal leg are given below.

	Normal	Abnormal
Coxa	3.8	3.7
Trochanter	2.0	1.5
Femur	7.0	5.0
Tibia	7.0	4.0
Tarsus	7.0	3.2
	<u>26.8</u>	<u>17.4</u>

The abnormal leg is perfectly formed except for the fourth tarsal segment which is reduced to a small triangular protuberance, devoid of articular connections, fused to the inner half of the distal portion of the third segment. Functionally, the tarsus of the abnormal leg is four-segmented since the fifth segment articulates with the third.—GEORGE S. TULLOCH, Merrick, New York.

***Hippodamia convergens* Guer.** This ladybird beetle was found congregating in vast hordes along the Merced River near the west entrance of Yosemite National Park, California on June 16, 1950. At this particular place where I stopped I could have picked up gallons of these beetles which were in masses on large rocks, among sticks and leaves near the rocks, and on low shrubs. These were within 15 feet of the river's edge. The congregating of these beetles has aroused interest for some time. In North Carolina I had observed them on mountain tops, especially on top of Mt. Pisgah at about 5700 feet altitude, in 1930.—D. L. WRAY, Raleigh, N. C.

## A NEW GROTELLA FROM SOUTHWEST TEXAS (LEPIDOPTERA, PHALAENIDAE)

By ROWLAND R. McELVARE, Port Washington, Long Island, N. Y.

### *Grotella vauriae* n. sp.

Palpi short, porrect, white at base, terminal segment rust colored. Antennal shaft rather thick and very faintly ciliate. Head and thorax white, shaded with rust colored scales at base of the patagia and anterior portion of the front. Frons with hollowed out process having corneous walls and truncate central process which is itself slightly hollowed out. Abdomen white, tinged dorsally with smoky.

Legs: foretibiae with long inner and short outer terminal claw, and two spines on each side. Midtibiae spined. No spines observed on hind tibiae. Fore and mid legs brownish, hindlegs white. Forewings cream colored tinged with rust. A median band of rust color extends upward from inner margin, narrowing and then widely extended outward as it fades toward the costa, which is also covered with rust colored scales. Terminal area broadly rust colored. Fringes with basal half rust colored, outer half white.



Secondaries immaculate, pearly white, slightly tinged with rust color along outer margin. Fringes white with rust colored line at base, becoming entirely white toward anal angle. Under side pearly, forewing tinged with rust, secondaries white. Fringes white.

Expanse 15 mm.

Holotype male, July 6, 1948, Tornillo Creek near Hot Springs on Rio Grande River, Brewster Co., Texas, taken at lights by C. and P. Vaurie. Unique type in collection of American Museum of Natural History, New York.\*

\* Since this specimen was collected the National Park Service has restricted collecting in National Parks to Federal employees. Accordingly, it is not likely that additional specimens will become available from the type locality in the near future as it is within the borders of the new Big Bend National Park.

The markings of this new species do not resemble those of other Grotellas and are more like *Schinia ciliata* Sm. from which it may be easily distinguished by its distinctive wing pattern and much smaller size, as well as by the characteristic Grotella frons. The Big Bend country, where it was taken, is isolated biologically by a great expanse of flat desert to the north and is more closely related to Mexico across the Rio Grande. This species may be a part of the fauna of that remote section.

---

**Periphyllus Aphid Notes.** Recently Professors F. O. Essig and M. A. Palmer have examined a number of slides of *Periphyllus* material from my collection. Among species at hand are:

*Periphyllus americanus* Baker. Abundant on sycamore maple at Logan, Utah, September and October 1941; on silver maple at Springville, Utah (Knowlton-C. F. Smith). Also on maple at Mt. Home, Idaho, 1940.

*P. brevispinosus* G.-P. on *Acer glabrum* in Logan Canyon, Utah, May 30, 1928.

*P. lyropictus* (Kessler). On *Acer macrophyllum* at Mt. Vernon Washington, June 20, 1949 (Tsi-ping Uy) and at Forest Grove, Oregon, October 21, 1919 (A. C. Burrill); on *Acer nigrum* at Logan, Utah, September 19, 1925.

*P. macrostachyae* (Essig). On desert willow at Bear River City, Utah, August 7, 1925, and on *Salix* at Current Creek near Fruitland, Utah, August 16, 1935.

*P. negundinis* (Th.). On *Acer negundo* at Prescott, Arizona, May 6, 1945; Parley's Canyon, Utah, 1925 (Knowlton-D. G. Hall).

*P. populicola* (Thos.). On *Populus* at Flagstaff, Arizona, September 22, 1944; at Union Gap, Washington, July 10, 1947 (B. J. Landis-E. W. Davis); Lovelock, Nevada, August 17, 1945; St. Marys, Montana, July 23, 1946; Randlette, Utah, September 7, 1932.

*P. populicola* var. *bruneri* (Will.). On *Populus tremuloides* in Logan Canyon, Utah, August 24, 1934 (Knowlton-C. F. Smith).

*P. testudinatus* Thornton. On sycamore maple leaves at Salt Lake City, Utah, October 10, 1941; on *Acer glabrum* in Logan Canyon, Utah, September 29, 1928; on *Acer circinatum* at Burn Lake, Canada, May 20, 1924 (A. P. Macdougall).

*P. utahensis* Knlt. on *Salix* at Rexburg, Idaho, June 23, 1935 (C. F. Smith).—G. F. KNOWLTON, Logan, Utah.

**A NEW SPECIES OF THE GENUS PSORTHASPIS  
HYMENOPTERA: (PSAMMOCHARIDAE)  
FROM ARIZONA**

By R. R. DREISBACH, Midland, Michigan.

F. Werner and W. Nutting collected four examples of a spider wasp in Arizona in 1949, which belongs to the genus *Psorthaspis*. These were deposited at Harvard and were included in a lot sent to the writer for identification. In Bradley's key (1) to this genus these run to the species *P. avinoffi* (Banks) and, except for the distribution, would seem to be that species. However, when comparative measurements were made on the head, ocelli, antennal joints, and dorsal parts of thorax, the comparative lengths of the various parts were entirely different, and these specimens are also considerably smaller in size.

This seems to be a new species and is described below.

***Psorthaspis arizonensis* n. sp.**

Holotype female: Body completely black with the integument greenish purple or violaceous; colored about like *P. avinoffi* (Banks); a few scattered, upright hairs on head, pronotum, mesonotum, propodeum, femora and coxae, and abdomen; the vertex extends above the tops of eyes just about the distance of the lateral ocelli from the eye margins; a very short oculomalar space; the area frontalis forms a narrow ridge bridging clypeus to front in the same plane as each; antennal fossae and about posterior one third of clypeus in a pit each side of frontal ridge; clypeus truncate in front; antennae located just above clypeus; fore ocellus not quite twice its diameter from the laterals and these slightly closer together than their distance to eye margins; relative head measurements (letters have the same meaning as in reference (1)): a 57, b 56, c 38, d 29, e 38, f 29, h 29, i 15; relative lengths of first four antennal segments: 19: 3: 14: 16; ocellar measurements: a 28, b 3.5, c 14, d 28; dorsal measurements: a 43, b 51, c 23; propodeum slightly sloping and rather abruptly declivous at posterior edge, concave on posterior surface, and with transverse ridges on the surface where the dorsal and posterior edges meet, as well as on the side ridge of propodeum, beginning about midway of dorsal surface and reaching the apex; wings with scales which give a brilliant coppery refulgence, from the base to the third cubital cell, basal part greenish and the apex brownish; both wings almost black as seen in normal light; the basal and transverse veins in fore wings in-

terstitial and the cubitus in rear wings arising much beyond the subdiscoidal; first intercubital vein meeting the second cubital cell much beyond center and the second meeting the third cubital cell about basal third; longer spur of posterior tibiae two fifths as long as its metatarsal joint.

Length: Head and thorax 6.62 mm, abdomen 7.95 mm, fore wing 11.0 mm, rear wing 8.6 mm.

Holotype female: 10 mi. E. of Sonofta, Sta. Cruz Co., Arizona, 4800 ft. Roadside weeds in grassland. July 27, 1949. F. Werner and W. Nutting (MCZ).

Paratypes: Two with same data and one: Cochise stronghold, Dragoon Mts., Cochise Co., Ariz. 4850 ft., Viii-2-1948, oak juniper zone W. Nutting and F. Werner. One paratype RRD collection, the rest MCZ.

This species runs to the couplet 2b in Bradley's key to this genus, reference (1), and the species *P. avinoffi* (Banks). However, the comparative measurements of the head, ocelli, antennae, and dorsal measurements are entirely different, as is also the overall size of the insect. Otherwise if it were not for the difference in geographical range it would appear to be the same species in a cursory examination.

This species can be fitted into Bradley's key as follows:

- 2a. Wings not covered with coppery scales ..... 4
- b. Wings except at apex covered with coppery scales, producing a brilliant coppery red and green refulgence. .... 3
- 3a. Head measurements a 57, b 52, c 32, d 31, e 41, f 28, h 20, i 24; ocellar measurements a 28, b 12, c 21, d 35; relative lengths of the first four antennal joints: 19:4:11:11; dorsal measurements a 43, b 61, c 36; overall length 18 mm. Haiti. .... *avinoffi* (Banks)
- b. Head measurements a 57, b 56, c 38, d 29, e 38, f 29, h 29, i 15; ocellar measurements a 28, b 3.5, c 14, d 28; relative lengths of first four antennal joints 19:3:14:16; dorsal measurements a 43, b 51, c 23; overall length 14.7 mm. Arizona. .... *arizonensis* n. sp.
- 4a. Same as Bradley's 3a.

#### REFERENCE

1. **Bradley, J. Chester** 1944. A preliminary revision of the Pompilinae (exclusive of the tribe Pompilini) of the Americas. Trans. Amer. Ent. Soc. LXX, pp. 23-157.

## THE GENUS PARAPROSALPIA (VILLENEUVE) IN NORTH AMERICA, (= *PROSALPIA* POKORNY PREOC.) MUSCIDAE.

By H. C. HUCKETT, Riverhead, New York.

The name *Paraprosalpia* was originally proposed by Villeneuve (1922)<sup>1</sup> for a subgenus of *Prosalpia* Pokorny (1893), and was raised to generic status by Kloet and Hincks (1945) to take the place of *Prosalpia* owing to the preoccupancy of the latter name by Koch in Arachnida.<sup>2</sup> The genus contains a number of species heretofore unrecorded from North America. The commonest representative found in collections is the oldest known species belonging to the group, namely *Musca silvestris* Fallén described from Sweden in 1824. In all fifteen species are herewith treated, of which eight occur in Europe, *P. conifrons* (Zetterstedt), *P. denticauda* (Zetterstedt), *P. incisa* (Ringdahl), *P. longipennis* (Ringdahl), *P. moerens* (Zetterstedt), *P. pilatarsis* (Stein), *P. sepiella* (Zetterstedt), *P. silvestris* (Fallén), and seven are known only from North America, namely, *P. arelate* (Walker), *P. angustatarsis* (Malloch), *P. brevitarsis* (Malloch), *P. constrictor* (Malloch), *P. littoralis* (Malloch) and two species that remain to be described.

The genus *Paraprosalpia* possesses few characters common to both sexes that may serve to differentiate the species from similar forms belonging to other genera of the Anthomyiinae. The males however may invariably be recognized by the striking appearance of the appendages to the fifth abdominal sternum. These processes or lobes appear typically as shining almost bare bladelike plates, that lie lengthwise in a vertical plane to the abdomen and are placed subparallel to each other. In the males of *denticauda* and *constrictor* they differ in being widely spaced apart and in protruding ventrad as stout erect appendages. Several species belonging to the genus may be more readily recognized through the possession of the following combination of characters: Eyes in male nearly as widely separated as in female to the extent that the shortest distance across frons in both sexes is less than the distance be-

<sup>1</sup> Figures in parenthesis refer to literature cited in the synonymies according to date of publication.

<sup>2</sup> Koch, L. 1872. Beitrag zu Kenntniss der Arachnidenfauna Tirols. Zeitschrift des Ferdinandeum für Tirol und Vorarlberg, ser. 3 XVII p. 328.

tween first pair of dorsocentral bristles, hind tibia with two rather strong bristles at middle placed respectively on anterodorsal and posterodorsal surface and with a single bristle near middle of posterior surface, fronto-orbital series of bristles in female lacking or if one or more pairs are present all are situated cephalad of a level with anterior ocellus, fore tarsus in female with two or more segments broader than segments of mid tarsus except in *angustitarsis*. The species indicated in such terms are *silvestris*, *angustitarsis*, *denticauda*, *constrictor*, *arclate*, as well as the European forms *P. billbergi* (Zetterstedt) and *P. teriolensis* (Pokorny). Subsidiary characters that I have found helpful in separating specimens belonging to the genus from similar forms in other groups are as follows: Eyes bare, arista minutely haired or bare, inner pair of vertical bristles in male erect, slender and longish, proboscis polished and moderately slender, apical scutellar setulae between apical bristles weak and hairlike in female but variable in male, lower calypttral scale not protruded beyond margin of upper scale, fifth abdominal segment from above shortened or abbreviated in relation to length of abdomen and to other segments, hypopygium semiglobose and anal cleft linear and restricted basad, hind tibia in male devoid of longish setulae on the posteroventral surface (though such may occur occasionally on median posterior plane), costa distad of union with subcosta devoid of setulae on under surface.

The habits of the species are evidently little known. It is commonly recorded (Karl 1928, Séguy 1937, Ringdahl 1942) that adults may be predacious on small midgelike flies, and Séguy further states that the larvae probably live in decaying animal or vegetable matter. Hobby<sup>3</sup> has noted instances of where females of *silvestris* and *billbergi* were caught with an Empidid and a Chironomid respectively as prey. Lundblad<sup>4</sup> has recorded *billbergi* among the larvae reared from cruciferous plants.

The group is primarily northern in its distribution, ranging from Alaska to Quebec and southward along the mountain ranges and adjacent territory. Most of the species were collected in the boreal and subalpine regions. Too many are only known from records of a limited nature.

<sup>3</sup> Hobby, B. M. 1934. Notes on predacious anthomyiidae and cordyluridae (Dipt.). Ent. Month. Mag., LXX: 186.

<sup>4</sup> Lundblad, O. 1933. Kålfugorna. Statens Växtskyddsanstalt, Stockholm. Meddelande N:r 3 p. 15, 18.



*Paraprosalpia* (Villeneuve)

*Prosalpia* Pokorny, Wien. Ent. Zeitg., XII: 54. 55 (1893).—Coquillett, Jour. N. Y. Ent. Soc., IX: 140 (1901).—Aldrich, Misc. Coll. Smithsn. Inst., XLVI: 553 (1905).—Stein, Kat. Paläark. Dipt., III: 697 (1907).—Coquillett, Proc. U. S. Nat. Mus., XXXVII: 595 (1910).—Schnabl and Dziedzicki, Abh. K. Leop.-Carol. Deutsch. Akad. Naturforsch., XCV (2): 93 (1911).—Stein, Arch. f. Naturgesch., (1915) LXXXI A (10): 156, 222 (1916).—Stein, Arch. f. Naturgesch., (1917) LXXXIII A (1): 152 (1919).—Ringdahl, Ent. Tidskr., XLI (1): 32–38 (1920).—Villeneuve, Bull. Mus. Nat. Hist. Natur., XXVIII: 511 (1922).—Séguy, Faune de France, VI: 78–81 (1923).—Karl, Tierwelt Deutschlands, XIII pt. 3 p. 196–198 (1928).—Ringdahl, Ent. Tidskr., LXIII (3–4): 134–136 (1942).—Collin, Ent. Month. Mag., LXXIX: 83–86 (1943).

*Paraprosalpia* Kloet and Hincks, List Brit. Ins., LIX: 426 (1945).

Genotype: *Prosalpia rambolitensis* Villeneuve (original designation).

The genus *Prosalpia* was erected by Pokorny in 1893 for the reception of three Tirolian species to which he gave the names *styriaca*, *teriolensis*, and *hydrophorina*. The group was characterized as having the frontal vitta between the eyes similarly restricted in width in male and female, and as having the second and third fore tarsal segments broadened in female. The first and last of these three names are listed by Stein (1907) as synonyms of *Anthomyza billbergi* Zetterstedt (1838) and *Musca silvestris* Fallén (1824) respectively.<sup>5</sup>

In 1901 Coquillett designated *Prosalpia styriaca* Pokorny as the genotype of *Prosalpia*, and later (1910) cited the earlier name *Prosalpia billbergi* (Zetterstedt) for the same species.

Stein (1916) broadened the concept of the genus *Prosalpia* to

<sup>5</sup> Schiner (Fauna Austriaca, I: 625, 1862) had earlier mistakenly used the name *Eriphia* Meigen for a group of three species, *montana*, *billbergi*, *silvestris*, each of the last two in error being given the name of the other (Stein 1907). Pokorny (1893) in correcting Schiner's improper use of the name *Eriphia* created the monobasic genus *Hyporites* for the reception of *Eriphia montana* Schiner, but did not fully realise that in proceeding to establish the genus *Prosalpia* he had also made provision for the two remaining species.

include species (*conifrons*, *pilitarsis*) which by contrast had wide frons and slender fore tarsi in the female, and which lacked the mid posterior bristle of hind tibia. The males of such species possessed appendages to the fifth abdominal sternum that were characteristic of the genus in their shining, bare appearance.

In 1922 Villeneuve, mindful of Ringdahl's (1920) earlier comments concerning the grouping of species belonging to the Swedish fauna, proposed the subgenus *Paraprosalpia* for the reception of those species in which the female had wide frons and slender fore tarsi. He designated the newly described *Prosalpia raumbolitensis* as subgenotype of *Paraprosalpia*.

This concept of the genus was accepted by both Séguy (1923, 1937) and Karl (1928), the latter agreeing with Ringdahl (1920) in regarding *Musca silvestris* Fallén as the type of *Prosalpia*.

Ringdahl (1942) in reviewing the sixteen species comprising the Swedish fauna recognized nine subgenera within the limits of the genus. The two earlier segregates *Prosalpia* and *Paraprosalpia* were retained for the reception of nine species, whilst the remaining subgenera were inscribed as monobasic. Three of the latter (*Coloptomyia*, *Prosalpiella*, *Eurydactylomyia*) had formerly been placed in *Hylemyia*,<sup>6</sup> and four (*Subprosalpia*, *Rhynchoprosalpia*, *Arctoprosalpia*, *Pseudoprosalpia*) were proposed as new.

Collin (1943) after studying the British species came to the conclusion that owing to the heterogeneity of many of the species comprising *Prosalpia* there seemed little advantage to employing additional names to denote the different segregates, particularly in the light of the characters proposed for their separation. In his opinion the whole group may be regarded as a natural one in which the species best manifest their common kinship in the character of the male appendages on the fifth abdominal sternum.

Kloet and Hincks (1945) in their check list of British insects applied the name *Paraprosalpia* for the genus, and rightly so in my opinion, to replace *Prosalpia*, a name that had been preoccupied by Koch in 1872 for a genus of *Opiliones*, Arachnida.<sup>2,7</sup> Two of

<sup>6</sup> Ringdahl, O. 1933. Översikt av i Sverige funna Hylemyia-arter. Ent. Tidskr., LIV (1): 31, 32. Ringdahl, O. 1932. Vier neue Anthomyiden. Notulae Entomologicae, XII: 19.

<sup>7</sup> I wish to acknowledge the generous assistance of Dr. J. C. Bradley of Cornell University and Dr. W. J. Gertsch of the American Museum of Natural History in construing this problem in nomenclature.

the seven species listed were represented among the original series in *Prosaltia*, which if recognized as a separate segregate would require a new name.

## KEY TO SPECIES

## (Males)

1. Hind tibia with a single bristle near middle of posterior surface ..... 2  
    Hind tibia without a bristle near middle of posterior surface 6
2. Fifth abdominal sternum with a pair of strong erect appendages projecting ventrad and at base widely separated; narrowest distance across frons more than half the distance between first pair of dorsocentral bristles ..... 3  
    Fifth abdominal sternum with platelike horizontal processes, narrowly separated at base; shortest distance across frons not more than half that between first pair of dorsocentral bristles ..... 4
3. Processes spatulate, blunt and rounded at apex, not tapering distad (fig. 15); shortest distance from base of vibrissa to eye margin equal to length of antenna.  
    *constrictor* (Mall.)  
    Processes pronglike, tapering and pointed at apex (fig. 14); shortest distance from base of vibrissa to eye margin slightly shorter than length of antenna ..... *denticauda* (Zett.)
4. Abdomen black and shining, unmarked; hind femur with posteroventral bristles fine, setulose; vibrissal angle extended cephalad to a level with base of antennae .. *arelate* (Walk.)  
    Abdomen grayish and pruinulent; hind femur with well developed posteroventral bristles; vibrissal angle not extended cephalad to a level with base of antennae ..... 5
5. Apical region of processes tapered and angularly produced (fig. 1); fore tibia usually with a mid posterodorsal bristle.  
    *silvestris* (Fall.)  
    Apical region of processes blunt and rounded in outline (fig. 2); fore tibia usually without a mid posterodorsal bristle.  
    *angustitarsis* (Mall.)
6. Shortest distance across frons exceeding that between first pair of dorsocentral bristles; frontal bristles continuous from base of antennae to vertex, as in female; fore and mid tibiae bristleless except at apex ..... *gentilis* n. sp.  
    Shortest distance across frons less than that between first pair

- of dorsocentral bristles; frontal series of bristles interrupted or restricted to cephalic region of frons . . . . . 7
7. Fronto-orbital region with two or three pairs of slender bristles adjacent ocellar callosity; fourth abdominal sternum much wider than long and with a dense series of long downwardly curving bristles along lateral margins; hind tibia with a weak apical posterodorsal bristle . . . . . *longipennis* (Ringd.)
- Fronto-orbital region devoid of such bristles, bare; fourth abdominal sternum with marginal bristles not notably dense nor curving downward . . . . . 8
8. Hind metatarsus with a sparse fringe of longish setulae along posteroventral surface; hind tibia with two or more long slender bristles at apex of posterodorsal surface; prosternum bare . . . . . *sepiella* (Zett.)
- Hind tarsal segments 2, 3 and 4 with long slender marginal setulae, segments 2 to 4 shorter than segment 1; prosternum setulose . . . . . *pilitarsis* (Stein)
- Hind tarsal segments normal, with no unusual vestiture . . . . . 9
9. Prealar bristle shorter than posterior notopleural bristle; hind tibia with two slender longish bristles at apex of posterodorsal surface, and with two antero- and two posterodorsal bristles . . . . . *littoralis* (Mall.)
- Prealar bristle longer than posterior notopleural bristle; hind tibia with one bristle at apex of posterodorsal surface, and with three or more bristles on either antero- or posterodorsal surface, or on both . . . . . 10
10. Vibrissal angle extended cephalad to a level with base of antennae; proboscis slender, distal section as long as height of head; basal plate of hypopygium polished . . . . . *moerens* (Zett.)
- Vibrissal angle not extended cephalad to a level with base of antennae . . . . . 11
11. Hind tibia with apical posterodorsal bristle short, not longer than diameter of tibia where situated; ventral (inner) margin of processes with a preapical incision (fig. 5); mesonotum not trivittate . . . . . *incisa* (Ringd.)
- Hind tibia with apical posterodorsal bristle long and usually well developed; ventral margin of processes with no preapical incision; mesonotum trivittate . . . . . 12
12. Cheeks broadly maintained caudad, at ventral point on eye margin nearly as high as half that of eye; hind tibia usually with two well developed bristles at apex of anteroventral surface . . . . . *genalis* n. sp.

Cheeks narrowed caudad by the advanced curve of occipitogenal margin, at ventral point on eye margin less than one third height of eye; hind tibia usually with one bristle at apex of anteroventral surface . . . . . 13

13. Hind femur with a dense series of bristles on proximal half of antero- and posteroventral surfaces; mid femur bristleless on anteroventral surface; mid tibia devoid of mid anterodorsal bristle; cerci without long apical bristles.

*brevitarsis* (Mall.)

Hind femur with a single series of bristles on antero- and posteroventral surfaces; mid femur with short bristles on anteroventral surface; mid tibia with a mid anterodorsal bristle; cerci with four long slender apical bristles.

*conifrons* (Zett.)

### (Females)

1. Hind tibia usually with a single bristle near middle of posterior surface; fore tarsus with two or more segments distinctly broader than those of mid tarsus except in *angustitarsis* 2

Hind tibia without a single bristle near middle of posterior surface; fore tarsal segments about equal in width to those of mid tarsus . . . . . 6

2. Black shining species, fifth abdominal tergum usually glossy and polished; vibrissal angle extended cephalad to a level with base of antennae . . . . . *arelate* (Walk.)

Grayish densely pruinose species, fifth abdominal tergum not polished black . . . . . 3

3. Fore tarsal segments 2 and 3 much wider than segments 4 and 5; fore tibia usually with a mid posterodorsal bristle.

*silvestris* (Fall.)

Fore tarsal segments 2 and 3 not wider than segments 4 and 5; fore tibia usually lacks mid posterodorsal bristle . . . . . 4

4. Fore tarsal segments 2, 3, 4 and 5 broader than those of mid tarsus; pruinescence whitish gray, calyptres white; abdominal sternum 5 notably broad, exceeding width of hind femur; shortest distance between eyes greater than length of third antennal segment . . . . . 5

Fore tarsal segments 2 to 5 not wider than those of mid tarsus; pruinescence yellowish gray, calyptres yellowish tinged; abdominal sternum 5 narrower than width of hind femur; shortest distance between eyes not greater than length of antennal segment . . . . . *angustitarsis* (Mall.)

5. Shortest distance from base of vibrissa to eye margin longer than length of antenna; marginal bristles on abdominal tergum 4 weak, scarcely longer than bristles on tergum 5; apex (caudal margin) of tergum 5 sharply compressed, as if pinched . . . . . *constrictor* (Mall.)  
 Shortest distance from base of vibrissa to eye margin shorter than length of antenna; marginal bristles on tergum 4 robust, much longer than bristles on tergum 5; caudal margin of tergum 5 not narrowly compressed from sides. . . . . *denticauda* (Zett.)
6. Mid tibia with medial bristle on anteroventral surface . . . . . 7  
 Mid tibia without medial bristle on anteroventral surface . . . . . 10
7. Shortest distance between eyes less than that between first pair of dorsocentral bristles; prealar bristle not longer than posterior notopleural bristle . . . . . *longipennis* (Ringd.)  
 Shortest distance between eyes not less than that between first pair of dorsocentral bristles; prealar bristle longer than posterior notopleural bristle . . . . . 8
8. Black shining species; vibrissal angle extended cephalad beyond a level with base of antennae; distal section of proboscis slender, as long as height of head; halteres purplish. . . . . *moerens* (Zett.)  
 Grayish or grayish brown species; vibrissal angle not extended cephalad beyond a level with base of antennae; proboscis slightly shorter than height of head; halteres yellow . . . . . 9
9. Fore tibia with a mid posterodorsal bristle; hind tibia with apical posterodorsal bristle setulose, weak . . . . . *incisa* (Ringd.)  
 Fore tibia without mid posterodorsal bristle; hind tibia with apical posterodorsal bristle robust . . . . . *conifrons* (Zett.)
10. Prealar bristle longer than anterior notopleural bristle . . . . . 14  
 Prealar bristle not longer than anterior notopleural bristle . . . . . 11
11. Fore and mid tibiae bristleless except at apex . . . . . *gentilis* n. sp.  
 Fore and mid tibiae with bristles in addition to those at apex . . . . . 12
12. Hind femur with one or two posteroventral bristles; hind tibia with apical posterodorsal bristle usually slightly longer than diameter of tibia where situated; prosternum bare . . . . . 13  
 Hind femur with no posteroventral bristles; hind tibia with apical posterodorsal bristle usually slightly shorter than diameter of tibia where situated; prosternum with setulae. . . . . *pilitarsis* (Stein)

13. Hind tibia usually with three posterodorsal bristles; parafacials at narrowest width broader than half width of third antennal segment . . . . . *sepiella* (Zett.)  
Hind tibia with two posterodorsal bristles; parafacials at narrowest width less than half breadth of third antennal segment . . . . . *littoralis* (Mall.)
14. Cheeks broadly maintained caudad, in height exceeding half that of eye; parafacials at narrowest width greater than length of third antennal segment; cheeks reddish.

*genalis* n. sp.

Cheeks restricted caudad by the advanced curve of occipito-genal margin, at ventral point of eye margin not greater than half height of eye; parafacials at narrowest width not greater than length of third antennal segment.

*conifrons* (Zett.)

*Paraprosalpia angustitarsis* (Malloch)

*Prosalpia angustitarsis* Malloch, Trans. Amer. Ent. Soc., XLVI: 184 (1920).—Huckett, Mem. 77 N. Y. (Cornell Agr. Exp. Sta., (1923) p. 51 (1924).—Johnson, Occ. Pap. Bost. Soc. Nat. Hist., VII: 236 (1925).—Johnson, Proc. Bost. Soc. Nat. Hist., XXXVIII (2): 94 (1925).—Johnson, Insect Faun. Biol. Surv. Mt. Desert Region, p. 211 (1927).—Frison, Bull. Ill. Nat. Hist. Surv., XVI Art. 4 p. 208 (1927).—Johnson, Psyche, XXXVI (2) 143 (1929).—Strickland, Can. Jour. Res., D XVI: 210 (1938).

*Prosalpia (Prosalpia) angustitarsis* Séguay, Gen. Insect., Fasc. 205 p. 126 (1937).

Alberta: ♂, Banff, VIII.29.17 (Mus. Nat. Hist. Natur.). ♀, Wabamun, VI.18.37 (E. H. Strickland).

Colorado: ♂, National Park (Hough). [U.S.N.M.]

Maine: ♂, Capens, VII.16.07. ♂, Echo Lake, Mt. Desert, VII.17.18. ♀, Seal Harbor, VII.29.30 (A. L. Melander). ♀, Bar Harbor, VIII.15.18 (C. W. Johnson). [U.S.N.M.]

Manitoba: ♂, Churchill River, 20 m. S. of Churchill, VII.5-6.37 (R. H. Daggy).

Massachusetts: ♂, ♀, Petersham, VII.30.26 (A. L. Melander). ♀, Otter River, VII.22.21 (M. D. Leonard).

Michigan: ♂, Douglas Lake, VII.12.31 (C. W. Sabrosky). [U.S.N.M.]

Minnesota: ♀, Cook County, Poplar Lake, VIII.10.29 (W. C. Stehr).

New Brunswick: ♀, Harcourt, VII.5.18. [C.N.C.]

New Hampshire: 3 ♂, ♀, Mt. Monadnock, VII.26.26, ♂, Benton, VII.6.31, ♂, ♀, White Mts., Dolly Copp, VII.13.31 (A. L. Melander). ♂, Flume-North Woodstock, VII.19.35.

New York: ♀, Black Mt., Lake George, IX.4.20 (M. D. Leonard). ♂, Riverhead, Long Island, VI.21.25.

Nova Scotia: ♀, Boisdale, Cape Breton, VII.18-19. Paratype. [A.M.N.H.]

Ontario: ♀, Macdiarmid, Lake Nipigon, VI.11-30.23. [C.N.C.]

Quebec: ♀, Mt. Albert, Gaspé Peninsular, VII.29.49 (H. Dietrich). 2 ♂, 2 ♀, Laniel, VI.28-VII.17.39 (J. L. Hitchon). [C.N.C.]

The species *angustitarsis* and *silvestris* agree closely in habitus and bristling. The female of *angustitarsis* however may be readily distinguished by the unenlarged second and third fore tarsal segments.

*Paraprosalpia arelate* (Walker)

*Eriphia arelate* Walker, List Dipt. Brit. Mus., IV: 961 (1849).—

Osten Sacken, Smithsn. Misc. Coll., III: 167 (1878).

*Eriphia pretiosa* Walker, List Dipt. Brit. Mus., IV: 965 (1849).—

Osten Sacken, Smithsn. Misc. Coll., III: 167 (1878).

*Phorbia pretiosa* Coquillett, Proc. Wash. Acad. Sci., II: 451 (1900).

*Prosalpia arelate* Stein, Zeitschr. Syst. Hymen. Dipt., I (4): 187 (1901).—Aldrich, Misc. Coll. Smithsn. Inst., XLVI: 553

(1905).—Johannsen, Ent. News, XXVIII: 325 (1927).—Stein, Arch. f. Naturgesch., (1917) LXXXIII A (1): 152 (1919).

*Prosalpia pretiosa* Stein, Zeitschr. Syst. Hymen. Dipt., I (4): 204 (1901).

*Prosalpia billbergi* Hockett not Zetterstedt, Can. Ent., LXVI: 134, 138 (1934).

Alaska: ♂, Matanuska, V.18.45 (J. C. Chamberlin). [U.S. N.M.]

Alberta: ♂, Edmonton, IV.24.26 (E. H. Strickland). ♀, Banff, VI.1.22 (C. B. D. Garrett). [C.N.C.]

North-West Territories: ♂, Hardisty Lakes, Gt. Slave Lake Region, VI.5.24 (J. Russell).

This robust species may be distinguished by its shining black color, and by the extension of the vibrissal region cephalad. In the male the processes are notched preapically on the inner margin (fig. 3). In the female the eyes are narrowly separated as in male,



the fore tarsal segments 2 to 5 are slightly but perceptibly and uniformly broadened, and, as in *billbergi*, the fifth abdominal tergum is polished black.

The Banff specimen was sent to Dr. van Emden at the British Museum for comparison with Walker's type specimens of *arelate* and *pretiosa*. He has kindly informed me that he regards the three specimens as conspecific, and that they are distinct from *billbergi* (Zett.), under which name I had previously placed them.

*Paraprosalpia brevitarsis* (Malloch)

*Hylemyia brevitarsis* Malloch, Trans. Amer. Ent. Soc., XLIV: 309 (1918).—Frison, Bull. Ill. Nat. Hist. Surv., XVI Art. 4 p. 201 (1927).—Séguy, Gen. Insect., Fasc. 205 p. 80 (1937). California: ♂, Lagunitas Canyon, Marin County, III.29.08 paratype. [A.N.S.P.]

The male of *brevitarsis* superficially resembles the paler, more robust forms of *conifrons*, from which it differs in possessing a double series of bristles on anteroventral surface of hind femur and on posteroventral surface of mid and hind femora. The processes are broadly maintained and the integument is not angularly protruded at middle of inner (ventral) margin, as is typically developed in *conifrons*.

*Paraprosalpia conifrons* (Zetterstedt)

*Aricia conifrons* Zetterstedt, Dipt. Scand., IV: 1569 (1845).

*Anthomyia incisivalva* Strobl, Mitth. Nat. Ver. Steiermark, XXXIV: 247 (1897).<sup>8</sup>

*Prosalpia conifrons* Stein, Arch. f. Naturgesch., (1915) LXXXI A (10): 157 (1916).—Ringdahl, Ent. Tidskr., XLI (1): 35 (1920).—Tiensuu, Act. Soc. Faun. Flor. Fenn., LVIII (4): 12 (1935).—Ringdahl, Opus. Entomol., IV (3-4): 147 (1939).—Collin, Ent. Month. Mag., LXXIX: 85 (1943).

*Prosalpia* (*Paraprosalpia*) *conifrons* Villeneuve, Bull. Mus. Nat. Hist. Natur., XXVII: 511 (1922).—Karl, Tierwelt Deutschlands, XIII pt. 3 p. 197 (1928).—Séguy, Gen. Insect., Fasc. 205 p. 127 (1937).—Ringdahl, Ent. Tidskr., LXIII (3-4): 142 (1942).

*Paraprosalpia conifrons* Kloet and Hincks, List Brit. Ins., LIN: 426 (1945).

<sup>8</sup> *Teste* Stein, P. 1916. Die Anthomyiden Europas. Arch. f. Naturgesch., (1915) LXXXI A (10): 157.

Alaska: ♂, Anchorage, VII.21.21.

Alberta: 2 ♂, Lake Louise, Banff, VII.27.17 (Mus. Nat. Hist. Natur.). ♀, Banff, VI.20.22 (C. B. D. Garrett). [C.N.C.]

British Columbia: ♀, Hedley, VII.21.23 (C. B. Garrett). [C.N.C.]

Idaho: 2 ♂, Waha, V.30.24 (A. L. Melander).

Oregon: ♀, Kiger's Island, IV.16.30 (R. E. Dimick).

Utah: ♂, ♀, Logan Dry Canyon, VI.25.44 (S. L. Wood).

Washington: ♀, Loon Lake, V.16.24 (A. L. Melander).

The specimens recorded above exhibit a wide variation in size and color. There are also slight differences in the structural proportions to cheeks, parafacials and frons of the head, and in the form of the processes of male fifth abdominal sternum. However they all possess the typical markings of *conifrons* on thorax and abdomen, including a pair of dark suffused spots in front of scutellum on the mesonotum, apparent when viewed from in front.

The specimens from Alaska, Alberta and British Columbia are darker and smaller, and possess the typical form of the male processes as exemplified in specimens taken in northern Sweden. The remainder of the specimens are paler, being grayish, and are more robust, having stronger bristles on femora and clearer wings. The processes in males from Idaho and Utah are broader throughout than in specimens from Alaska and Alberta, and whilst the angular profile of the integument at or near middle of inner margin is typical of the species in the Idaho males (fig. 6), this character is not so obvious and appears nearer the base of inner margin in the Utah male, evidently partly due to the shallower emargination. The male cerci in all these specimens have four prominent slender apical bristles. An examination of the copulatory appendages of the hypopygium and of the genitalia in males from Sweden, Idaho and Utah reveals a marked similarity in structure and bristling.

*Paraprosalpia constrictor* (Malloch)

*Hylemyia constrictor* Malloch, Ohio Jour. Sci., XX (7): 277 (1920).—Séguy, Gen. Insect., Fasc. 205 p. 87 (1937).

Alaska: ♂, Valdez, VI.4.19, holotype (Ohio State Museum). ♀, Cordova, (J. S. Hine). ♀, Matanuska, V.12.45 (J. C. Chamberlin). [U.S.N.M.]

Alberta: ♀, Banff, VI.12.22 (C. B. D. Garrett).

Manitoba: 3 ♂, 3 ♀, Churchill, VI.18.48 (G. E. Shewell). [C.N.C.]

(Continued in the December issue)

# BULLETIN

OF THE

## BROOKLYN ENTOMOLOGICAL SOCIETY

---

VOL. XLV

DECEMBER, 1950

No. 5

---

### THE GENUS *PARAPROSALPIA* (VILLENEUVE) IN NORTH AMERICA, (*PROSALPIA* POKORNY PREOC.) MUSCIDAE.

By H. C. HUCKETT, Riverhead, New York

(Continued from October issue)

The species *constrictor* is allied to *denticauda*. The processes in the male are equally striking, those of *constrictor* being spatulate in form and having a rounded blunt apex (fig. 15). In the female of *constrictor* the buccal region of cheeks is more extensive, the tergal bristles of abdomen are weaker, and fifth abdominal tergum is peculiarly constricted at apex.

#### *Paraprosalpia denticauda* (Zetterstedt)

*Anthomyza denticauda* Zetterstedt, Ins. Lapp., p. 675 (1838).

*Anthomyza senilis* Zetterstedt, Ins. Lapp., p. 682 ♀ (1838).<sup>9</sup>

*Aricia denticauda* Zetterstedt, Dipt. Scand., IV: 1502 (1845).

*Myopina denticauda* Stein, Kat. Paläark. Dipt., III: 677 (1907).

*Prosalia denticauda* Ringdahl, Ent. Tidskr., XLI (1): 33 (1920).

—Ringdahl, Ent. Tidskr., XLVII (2): 101 (1926).—Tiensuu, Act. Soc. Faun. Flor. Fenn., LVIII (4): 12 (1935).—Ringdahl, Opus. Entomol., IV (3-4): 140 (1939).

*Prosalia (Prosalia) denticauda* Séguay, Gen. Insect., Fasc. 205 p. 126 (1937).

---

<sup>9</sup> *Teste* Ringdahl, O. 1939. Diptera der Fam. Muscidae, (die Gattungen *Aricia* und *Anthomyza*) von Zetterstedt in "Insecta Lapponica" und "Diptera Scandinaviae" beschrieben. Opus. Entomol., IV (3-4): 143.

*Prosalpia* (*Subprosalpia*) *denticauda* Ringdahl, Ent. Tidskr., LXIII (3-4): 140 (1942).

Quebec: ♂, Thunder River, VI.10.29 (W. J. Brown). [C.N.C.]

The male of *denticauda* may be distinguished from that of *constrictor* by the sharp pointed character of the processes of fifth abdominal sternum (fig. 14). In the female the buccal region of cheeks is less pronounced, the tergal bristles of abdomen stronger, and there are no marked constrictions of the integument at apex of fifth abdominal tergum.

*Paraprosalpia incisa* (Ringdahl)

*Prosalpia senilis* Ringdahl not Zetterstedt, Ent. Tidskr., XLI (1): 36 ♂ (1920).

*Prosalpia incisa* Ringdahl, Ent. Tidskr., XLVII (2): 101 (1926).

*Prosalpia* (*Prosalpia*) *incisa* Séguy, Gen. Insect., Fasc. 205 p. 127 (1937).—Ringdahl, Ent. Tidskr., LXIII (3-4): 140 (1942).

Ontario: ♀, Low Bush, Lake Abitibi, VI.18.25 (N. K. Bigelow). [C.N.C.]

Quebec: ♀, Mascanin, VI.20.29 (W. J. Brown). [C.N.C.]

My recognition of the species *incisa* from North America is based on the above female specimens, which have been compared with Swedish examples. I have concluded that there are insufficient differences between the specimens to warrant their separation as different species. The chief characters for their identification have been given in the keys.

*Paraprosalpia littoralis* (Malloch)

*Pegomyia littoralis* Malloch, Bull. Brooklyn Ent. Soc., XV (5): 127 (1920).—Huckett, Mem. 77 N. Y. (Cornell Agr. Exp. Sta., (1923) p. 45 (1924).—Johnson, Occ. Pap. Bost. Soc. Nat. Hist., VII p. 232 (1925).—Johnson, Insect Faun. Biol. Surv. Mt. Desert Region, p. 120 (1927).—Frison, Bull. Ill. Nat. Hist. Surv., XVI Art. 4 p. 206 (1927).—Séguy, Gen. Insect., Fasc. 205 p. 59 (1937).

Maine: 2 ♂, Bar Harbor, VII.21.19 (C. W. Johnson).

New Hampshire: ♂, Noxon Camp, 2000 ft. alt., VII.5.31 (J.M. Aldrich). [U.S.N.M.] ♂, Franconia Notch, VII.8.31, ♂, Lost River, VII.7.31 (A. L. Melander).

New York: ♂, Wilmington Notch, Adirondacks, VII.2.22 (J. M. Aldrich). [U.S.N.M.] 2 ♂, Old Forge, VII.6.05, 2 ♀, VIII.2.05.

The species *littoralis* belongs more properly to *Paraprosalpia* than to *Pegomyia*, in my opinion, and is closely related to *sepiella*. The male of *littoralis* has the processes dull and formed as in *sepiella*, and also has in common with that species two slender longish apical posterodorsal bristles on hind tibia. It may however be distinguished from *sepiella* by the absence of longish posteroventral setulae on hind metatarsus. The females of *littoralis* and *sepiella* are scarcely distinguishable for diagnostic purposes. Specimens of *littoralis* were sent to Ringdahl for comparison with the closely allied form *P. aldrichi* described from Sweden, which he informs me is distinct from *littoralis*.

*Paraprosalpia longipennis* (Ringdahl)

*Chortophila longipennis* Ringdahl, Ent. Tidskr., XXXIX (2): 189 (1918).

*Prosalpia longipennis* Ringdahl, Ent. Tidskr., XLI (1): 31 (1920).—Tiensuu, Act. Soc. Faun. Flor. Fenn., LVIII (4): 12 (1935).—Strickland, Can. Jour. Res., D XVI: 210 (1938).

*Hylemyia bicrucata* Malloch, Trans. Amer. Ent. Soc., XLVI: 190 (1920).—Frison, Bull. Ill. Nat. Hist. Surv., XVI Art. 4 p. 201 (1927).—Séguy, Gen. Insect., Fasc. 205 p. 78 (1937).

*Prosalpia (Prosalpia) longipennis* Séguy, Gen. Insect., Fasc. 205 p. 127 (1937).

*Prosalpia (Arctoprosalpia) longipennis* Ringdahl, Ent. Tidskr., LXIII (3-4): 144 (1942).

Alberta: 2 ♂, ♀, Elk Island, V.16.37, ♀, Clymont, V.20.37 (E. H. Strickland). 2 ♀, Edmonton, V.16.37 (F. O. Morrison).

Labrador: ♂, Great Caribou Island, VII.27.06, holotype *Hylemyia bicrucata* Malloch. (Ill. Nat. Hist. Surv.).

Manitoba: 7 ♂, 7 ♀, Churchill, VI.17-VII.3.48 (G. E. Shewell). [C.N.C.]

Quebec: ♂, Harrington Harbor, VI.30.29 (W. J. Brown). [C.N.C.]

The male of *longipennis* may be readily recognized by the dense series of slender downwardly curving bristles along lateral margins of abdominal sternum 4. The frons in male is distinctly wide for that sex, and in the female it is but little wider. In the male there are two or more pairs of slender bristles on fronto-orbital region adjacent ocellar callosity. In both sexes the prealar bristle is not longer than posterior notopleural bristle, and there may be one or more semierect setulae at middle of posterior surface of hind tibia.

Through the kindness of Dr. H. H. Ross I have been able to reexamine Malloch's type of *bicrucata*, and thus to verify the above synonymy.

*Paraprosalpia moerens* (Zetterstedt)

- Anthomyza billbergi* Zetterstedt, Ins. Lapp., p. 678 ♀ (1838).<sup>10</sup>  
*Anthomyza moerens* Zetterstedt, Ins. Lapp., p. 681 (1838).  
*Aricia moerens* Zetterstedt, Dipt. Scand., IV: 1531 (1845).—  
 Siebke, Enum. Insect. Norveg., IV: 111 (1877).  
*Prosalpia moerens* Ringdahl, Ent. Tidskr., XLI (1): 35 (1920.—  
 Ringdahl, Tromsø Museums Årshefter, (1926) XLIX (3): 36  
 (1928).—Tiensuu, Act. Soc. Faun. Flor. Fenn., LVIII (4): 12  
 (1935).—Ringdahl, Opus. Entomol., IV (3-4): 142 (1939).  
*Prosalpia* (*Prosalpia*) *moerens* Séguéy, Gen. Insect., Fasc. 205  
 p. 127 (1937).  
*Prosalpia* (*Rhynchoprosalpia*) *moerens* Ringdahl, Ent. Tidskr.,  
 LXIII (3-4): 142 (1942).  
 Alaska: ♂, Umiat, VI.20.47 (L. A. Jachowski). [U.S.N.M.]  
 Quebec: ♂, Little Mecatina Island, VII.6.29 (W. J. Brown).  
 [C.N.C.]

The species *moerens* has the vibrissal region extended cephalad as in *arelate*, so that the oral margin in profile attains a level with base of antennae. The hind tibia has no bristle at middle of posterior surface as is present in *arelate* and associated species, and the proboscis is unusually slender for a member of this group. In the absence of female specimens from North America I have relied on specimens of *moerens* taken in Lapland for key purposes.

*Paraprosalpia pilitarsis* (Stein)

- Prosalpia pilitarsis* Stein, Ent. Nachr., XXVI: 313 (1900).—  
 Stein, Arch. f. Naturgesch., (1915) LXXXI A (10): 157  
 (1916).—Ringdahl, Ent. Tidskr., XLI (1): 33 (1920).—Col-  
 lin, Ent. Month. Mag., LXXIX: 85 (1943).  
*Chortophila pilitarsis* Stein, Kat. Paläark. Dipt., III: 722 (1907).  
*Prosalpia* (*Prosalpia*) *pilitarsis* Séguéy, Gen. Insect., Fasc. 205  
 p. 127 (1937).  
*Prosalpia* (*Paraprosalpia*) *pilitarsis* Ringdahl, Ent. Tidskr., LXIII  
 (3-4): 143 (1942).  
*Paraprosalpia pilitarsis* Kloet and Hincks, List Brit. Ins., LIX:  
 426 (1945).

<sup>10</sup> Teste Ringdahl, O. 1939. *loc. cit.* p. 140.

Idaho: ♂, Gold Hill, Latah County, VII.27.27 (J. M. Aldrich). [U.S.N.M.]

Montana: ♂, Glacier Park Station, 4800 ft. alt., VII.24.—(J. M. Aldrich). [U.S.N.M.]

Vermont: ♀, near West Rupert, Mother Myrick Mountain, VII.14.35 (Blanton & Borders).

The male of *pilitarsis* may be readily distinguished from its allies by the marginal series of longish slender setulae on hind tarsal segments 2, 3 and 4. Collin (1943) has pointed out that the prosternum of thorax in both sexes has a few fine setulae, and thereby the female at least may be distinguished from such similar forms as *sepiella* and *littoralis*.

*Paraprosalpia sepiella* (Zetterstedt)

*Aricia sepiella* Zetterstedt, Dipt. Scand., IV: 1541 (1845).

*Chortophila sepiella* Stein, Wien, Ent. Zeitg., XXI: 41 (1902).—

Stein, Kat. Paläark. Dipt., III: 723 (1907).

*Chortophila setitarsis* Stein, Arch. f. Naturgesch., (1915) LXXXI A (10): 175 (1916).

*Prosalpia sepiella* Ringdahl, Ent. Tidskr., XLI (1): 33 (1920).—

Tiensuu, Act. Soc. Faun. Flor. Fenn., LVIII (4): 12 (1935).—

Ringdahl, Opus. Entomol., IV (3-4): 151 (1939).—Collin, Ent. Month. Mag., LXXIX: 85 (1943).

*Prosalpia (Paraprosalpia) sepiella* Karl, Tierwelt Deutschlands, XIII pt. 3 p. 197 (1928).—Séguy, Gen. Insect., Fasc. 205 p. 127

(1937).—Ringdahl, Ent. Tidskr., LXIII (3-4): 144 (1942).

*Hylemyia pedicellaris* Hockett, Can. Ent., LXI: 181 (1929).

*Paraprosalpia sepiella* Kloet and Hincks, List Brit. Ins., LIX: 426 (1945).

Alberta: ♂, Banff, V.27.22 (C. B. D. Garrett), holotype of *Hylemyia pedicellaris* Hockett. [C.N.C.] ♀, Banff, VI.15.22.

The male of *sepiella* may be readily distinguished from those of related forms by the sparse series of longish setulae on postero-ventral surface of hind metatarsus. In common with males of *littoralis* and the European species *P. sitiens* (Collin) and *P. aldrichi* (Ringdahl) and the native form *Hydrophoria subpellucida* Malloch the male of *sepiella* possesses more than one slender longish bristle at apex of posterodorsal surface of hind tibia.

*Paraprosalpia silvestris* (Fallén)

*Musca silvestris* Fallén, Muscides, p. 70 (1824).

- Anthomyia apina* Walker, List Dipt. Brit. Mus., IV: 927 (1849).—Osten Sacken, Misc. Coll. Smithsn., III: 168 (1878).
- Anthomyia donuca* Walker, List Dipt. Brit. Mus., IV: 946 (1849).—Osten Sacken, Misc. Coll. Smithsn., III: 169 (1878).
- Eriphia grisea* Walker, List Dipt. Brit. Mus., IV: 962 (1849).—Osten Sacken, Misc. Coll. Smithsn., III: 167 (1878).
- Hylephila silvestris* Coquillett, Proc. Wash. Acad. Sci., II: 452 (1900).
- Prosalpia silvestris* Stein, Zeitschr. Syst. Hymen. Dipt., IV: 186, 195, 197 (1901).—Aldrich, Misc. Coll. Smithsn. Inst., XLVI: 553 (1905).—Stein, Arch. f. Naturgesch., (1915) LXXI A (10): 157 (1916).—Johannsen, Ent. News, XXVIII: 325 (1917).—Ringdahl, Ent. Tidskr., XLI (1): 34 (1920).—Huckett, Mem. 77 N. Y. (Cornell) Agr. Exp. Sta., (1923) p. 51 (1924).—Johnson, Occ. Pap. Bost. Soc. Nat. Hist., VII: 236 (1925).—Johnson, Proc. Bost. Soc. Nat. Hist., XXXVIII (2): 94 (1925).—Johnson, Insect Faun. Biol. Surv. Mt. Desert Region, p. 211 (1927).—Johnson, Psyche, XXXVI (2): 143 (1929).—Tiensuu, Act. Soc. Faun. Flor. Fenn., LVIII (4): 11 (1935).—Strickland, Can. Jour. Res., D XVI: 210 (1938).—Brimley, Ins. North Carolina, Suppl., p. 28 (1942).—Collin, Ent. Month. Mag., LXXIX: 85 (1943).
- Prosalpia (Prosalpia) silvestris* Séguy, Faune de France, VI: 79 (1923).—Karl, Tierwelt Deutschlands, XIII pt. 3 p. 196 (1928).—Séguy, Gen. Insect., Fasc. 205 p. 127 (1937).—Ringdahl, Ent. Tidskr., LXIII (3-4): 139 (1942).
- Paraprosalpia silvestris* Kloet and Hincks, List Brit. Ins., LIX: 426 (1945).
- Alaska: 3 ♂, 3 ♀, Matanuska, V.30-VI.30.45 (J. C. Chamberlin) [U.S.N.M.] ♀, Seward, VII.12.15.
- Alberta: 5 ♀, Waterton, VII.6-8.23 (H. L. Seamans) [C.N.C.] ♂, 3 ♀, Edmonton, VI.6.37, ♂, Elk Island, VIII.12.23, ♀, Wabamun, VI.14.36 (E. H. Strickland). ♀, Banff, VI.7.48.
- British Columbia: ♀, Pass Creek, V.23.47, ♂, 17 ♀, Robson, VI.12-IX.11.47 (H. R. Foxlee), ♀, Salmon Arm, VII.6.25 (A. A. Dennys). [C.N.C.] 2 ♀, Goldstream to Downie Creek, Selkirk Mts., VIII.7-11.05.
- Colorado: ♂, Cameron Pass, 10,285 ft. alt., VIII.21.40 (G. F. Knowlton). ♀, Little Beaver Creek, VII.11.37 (C. L. Johnson). ♀, Red Mt., Pass, VII.1.37 (R. H. Beamer).
- Idaho: ♀, Elk River, VII.15.10. ♀, Mt., Moscow, VI.6.30 (H. Waters). ♀, Collins, VII.24.98. [A.M.N.H.]



Labrador: ♂, Nain, VII.30.22 (Waugh).

Maine: ♀, Pittston, VIII.3.30 (A. L. Melander).

Manitoba: ♂, Teulon, VI.11.22. ♀, Churchill, VIII.2-9.37 (R. H. Daggy).

Massachusetts: ♂, Cummington, VIII.14.34 (A. B. Gurney). ♂, Dedham, IX.4.-.

Michigan: ♀, Cheboygan County, VIII.8.43, ♂, Iron County, VII.24.47 (R. R. Dreisbach). 2 ♂, Cusino, VI.26-27.40 (C. W. Sabrosky).

Minnesota: ♀, Two Harbors, Stewart River, VIII.11.29 (W. C. Stehr).

New Brunswick: ♂, Red Rapids, VII.23.13 (R. P. Gorham), ♂, St. Leonards, VI.30.14, ♀, Fredericton, VI.25.15 (F. M. McKenzie), ♀, Millerton, VII.12.18. [C.N.C.]

New Hampshire: ♀, Mt. Monadnock, VII. 26.26 (A. L. Melander). ♂, Mt. Washington, (A. T. Slosson). [A.M.N.H.]

New York: ♀, Ringwood, Tompkins County, VIII.17.28. ♀, Lake Tackawasick, VI.25.20 (M. D. Leonard).

North Carolina: ♂, Swannanoa, VII.10.13 (C. L. Metcalf). ♂, Blantyre, V.-.08 (F. Sherman). ♀, Black Mountain, May (N. Banks). [U.S.N.M.]

North-West Territories: 2 ♂, Yellowknife, VII.11.49 (R. R. Hall), ♀, Cameron Bay, Great Bear Lake, VII.22.37 (T. N. Freeman). [C.N.C.]

Nova Scotia: ♀, Truro, IX.19.13.

Ontario: 3 ♀, Westree, VII.16-30.29 (H. S. Fleming), 6 ♂, 6 ♀, Low Bush, Lake Abitibi, VI.4.-VIII.13.25, ♂, Macdiarmid, Lake Nipigon, VI.11.22 (N. K. Bigelow), ♀, Sudbury. ♀, Burke Falls, VII.14.26, ♀, Sand Lake, VI.30.26, ♂, Block Rapids, Rideau River, VIII.23.27 (F. P. Ide). [C.N.C.] 2 ♀, Waubamie, Parry Sound, VI.8.15 (J. M. Aldrich). [U.S.N.M.]

Quebec: 11 ♀, Fort Chimo, VII.13-29.48 (H. N. Smith), 5 ♂, 22 ♀, Laniel, VI.2-30.44 (A. R. Brooks). ♂, Seven Isles, VII.18.24 (F. W. Waugh), ♂, Kazubazua, VI.6-10.27 (W. J. Brown), 4 ♂, 3 ♀, Great Whale River, VII.4-18.49 (J. R. Vockeroth), ♀, Knowlton, VI.23.29 (L. J. Milne), ♀, Mutton Bay, VII.11.29, 2 ♀, Harrington Harbor, VI.30-VII.3.29 (W. J. Brown) [C.N.C.] 6 ♂, 2 ♀, Sully, VIII.8.36 (J. Ouellet). [A.M.N.H.]

Saskatchewan: ♂, Cypress Hills, VI.1.39 (A. R. Brooks). [C.N.C.]

South Dakota: ♂, ♀, Custer, VII.22.24.

Vermont: ♀, Norwich, (C. M. Weed).

Wisconsin: ♀, Tenderfoot Lake, Vilas County, VII.-.12 (W. S. Marshall). [U.S.N.M.]

Wyoming: ♂, Lewis Lake, Yellowstone National Park.

Yukon Territory: 3 ♂, Whitehorse, VII.8.49. [C.N.C.]

The males of *silvestris* and *angustitarsis* resemble one another in many respects. They may be distinguished invariably by the shape of the processes when viewed in profile (figs. 1 and 2). The presence or absence of mid posterodorsal bristle of fore tibia is not always a reliable character for their distinction.

### *Paraprosalpia genalis* n. sp.

Male; black, with sparse pale grayish pruinescence, antennae and palpi black, cheeks rufous; mesonotum with three weak vittae and when viewed from in front with two large subfuscous marks caudad before base of scutellum; abdominal vitta ill defined and caudal incisures of terga weak, processes of fifth sternum black and partly shining; legs black, knees reddish tinged at extreme apex; wings tinged, denser basad, calyptae whitish, halteres dull yellow. Head buccate, cheeks and parafacials very broad, the

---

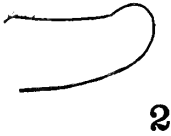
### EXPLANATION OF PLATE V

Lateral aspect of male appendages on fifth abdominal sternum with bristles removed. Drawings made from dried specimens, with the ventral (inner) margin of appendages being uppermost in figures 1 to 13.

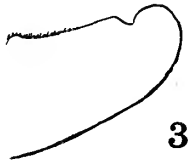
- FIG. 1. *Paraprosalpia silvestris* (Fallén).
- FIG. 2. *Paraprosalpia angustitarsis* (Malloch).
- FIG. 3. *Paraprosalpia arelate* (Walker).
- FIG. 4. *Paraprosalpia moerens* (Zetterstedt).
- FIG. 5. *Paraprosalpia incisa* (Ringdahl).
- FIG. 6. *Paraprosalpia conifrons* (Zetterstedt).
- FIG. 7. *Paraprosalpia brevitarsis* (Malloch).
- FIG. 8. *Paraprosalpia longipennis* (Ringdahl).
- FIG. 9. *Paraprosalpia genalis* n. sp.
- FIG. 10. *Paraprosalpia gentilis* n. sp.
- FIG. 11. *Paraprosalpia littoralis* (Malloch).
- FIG. 12. *Paraprosalpia sepiella* (Zetterstedt).
- FIG. 13. *Paraprosalpia pilitarsis* (Stein).
- FIG. 14. *Paraprosalpia denticauda* (Zetterstedt).
- FIG. 15. *Paraprosalpia constrictor* (Malloch).



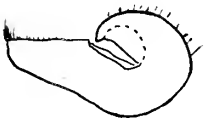
1



2



3



4



5



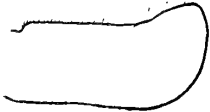
6



7



8



9



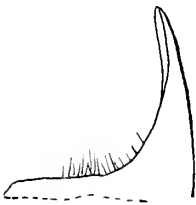
10



11



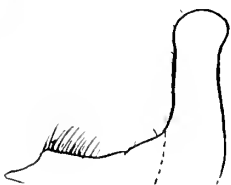
12



14



13



15

former higher and the latter at narrowest width fully as wide as length of third antennal segment, breadth of cheeks well maintained caudad. Mesonotum with acrostical bristles setulose, prealar bristle long, posterior notopleural bristle short, sternopleural bristles arranged 2:3, the lower bristles weak. Abdomen narrowly conical, processes broadly maintained, inner (ventral) margin even and not indented, notched at extreme base and fringed with minute spinules, outer (dorsal) and caudal margins with a sparse series of weak bristles. Fore tibia with a mid posteroventral bristle, mid femur with a series of shorter bristles on proximal half of anteroventral and of longer bristles on proximal half to two thirds of posteroventral surface, mid tibia with 1 anterodorsal, 1 or 2 posterodorsal and 2 bristles posteroventrally placed, hind femur with a sparse series of well formed bristles along entire anteroventral surface, and with a shorter series of shorter bristles on proximal half of posteroventral surface, hind tibia with 3 or 4 bristles on each of anteroventral, anterodorsal, posterodorsal surfaces, apical posterodorsal bristle long, 2 bristles at apex of anteroventral surface. Tarsi slender, hind pair about as long as hind tibiae, mid and fore pairs longer than their respective tibiae. Length, 8 mm.

Female largely similar to male except for secondary sexual characters; frons viewed from above fully one third width of head, cheeks and parafacials slightly wider than in males; fore tibia with a mid anterodorsal bristle, mid tibia with 2 anterodorsal and 2 posterodorsal bristles.

Holotype and allotype: ♂, ♀, Livermore, California, March 14, 1937 (George Ferguson). [U.S.N.M.]

Paratypes: ♂, Ukiah, California, March 31, 1931 (C. C. Wilson). 2 ♂, Zion National Park, Utah, March 26, 1944 (G. F. Knowlton).

The species *genalis* is notable for the buccate appearance of the head, resembling *Leucophora* in this respect, and thereby differing to a marked extent from its congeners.

### ***Paraprosalpia gentilis* n. sp.**

Male: blackish with grayish drab pruinescence and brownish infuscation, head with frontalia blackish and trace of reddish at base of antennae, parafrontals brownish, parafacials and cheeks whitish with rufous tinge, antennae and palpi black; mesonotum with trace of three brownish vittae, abdomen with ill defined brownish dorsocentral marking and with weak anterior and posterior tergal incisures; processes largely polished and black. Legs gray-

ish black, pulvilli white, wings brownish tinged, denser basad, calyptrae whitish, halteres dull yellow. Head with frons wider than distance between first pair of dorsocentral bristles, bristled as in female; parafacials at base of antennae and cheeks slightly wider than breadth of third antennal segment, the former narrower ventrad to less than width of third antennal segment, apex of antennae nearly reaching level of oral margin. Prosternum bare, acrosticals sparse, two pairs of weak presutural bristles, prealar bristle less than length of anterior notopleural bristle, sternopleural bristles arranged 2:2, the lower anterior bristle very weak. Abdomen subcylindrical, processes uniformly broad and with blunt rounded caudal margin, inner (ventral) margin slightly angularly protruded at base, outer (dorsal) border with a series of weak bristles terminating caudad in a long well developed bristle, caudal margin and inner margin except at base fringed with a sparse series of fine hairs, the basal region being coarsely spinulose. Legs weakly bristled, tibiae notably setulose, fore and mid tibiae bristleless except at apex. Mid femur with a series of bristles on proximal two thirds of posteroventral surface. Hind femur with bristles extending in series to base of anteroventral surface, and on proximal half of posteroventral surface, the latter bristles shorter than width of femur. Hind tibia with 1 or 2 anteroventral, 2 antero-dorsal, and in the type with 1 posterodorsal bristle, apical posterodorsal long and apical anterodorsal lacking. Tarsi shorter than their respective tibiae, fore tarsi only slightly so. Wings notably long with *m-cu* cross vein erect. Length, 5 mm.

Female similar to male, the tarsi being slightly longer and wings less densely tinged.

Holotype and allotype: ♂, ♀, Tennessee Pass, Colorado, 10,240 ft. alt., VII.7.- (J. M. Aldrich). [U.S.N.M.]

The male of *gentilis* has the frons widely formed and possesses a series of bristles bordering the interfrontalia as in the female. The fore and mid tibiae in both type specimens are bristleless except at apex.

NOTES ON SOME GENERA AND SPECIES OF  
EASTERN MOTHS WITH DESCRIPTIONS  
OF NEW SPECIES (LEPIDOPTERA,  
PHALAENIDAE).

By JOHN G. FRANCLEMONT, Washington, D. C.

The following notes and descriptions are the result of some studies made at Cornell University and at the United States National Museum.

AMPHIPYRINAE

*Procus* Oken, 1815.

*Procus* Oken (Oken's Lehrbuch der Naturgeschichte, vol. 3 (1), p. 682, 1815) with type *Noctua latruncula* Schiffermüller, 1775, designated by Tams (Entomologist, vol. 72, p. 73, 1939) is an older name for *Oligia* Hübner (Verzeichniss bekannter Schmettlinge [sic!], p. 213, [1821]) with type *Phalacna strigilis* Clerck, 1759, designated by Grote (Abhandlungen des naturwissenschaftlichen Vereins zu Bremen, vol. 14, p. 81, 1895). The two genotypes are extremely closely related species, and until very recently they were regarded as "varieties" of the same species by most European workers. The name *Procus* has been substituted for *Oligia sensu* Hampson by most workers in Europe, and the same action should be taken by American workers.

*Procus crytora* n. sp.

In 1946 Dr. Ralph L. Chermock gave me some material which he had collected at Conistee Falls near Brevard, North Carolina; among the many interesting things from this lot was the new species described here. Later I found a specimen in the series of *semicana* Walker in the collection of the United States National Museum, and another specimen was sent in for identification by Dr. A. R. Shadle, of the University of Buffalo. I feel certain that this is the moth identified as *Oligia tonsa subjuncta* by Wild from Allegany State Park, New York, the locality of Dr. Shadle's specimen. (See Forbes, in Leonard, List of the Insects of New York, p. 647, 1928.) If the moth is present in collections, it will most likely be found under *tonsa subjuncta* or *semicana*, the latter of which it resembles closely.

General habitus and pattern of *semicana* Walker, but decidedly paler. The forewing with the basal half blackish overlaid with red-

dish scales, the outer half white with a slight grayish cast; the margin between the dark and light areas sharply defined by a bent line formed by the inner margin of the reniform and the lower part of the t. p. line; orbicular the same color as the ground of the basal area, outlined by a black annulus; the reniform oblique, defined by the blackish basal area on the inner side and by two spots on the outer side at the upper half; t. p. line defined by black dots on the veins; costa with a distinct trapezoidal black patch between t. p. and s. t. lines; subterminal area with two small, dark, blurred areas, one near the middle and the other near the outer angle; the s. t. line white and irregular. Hind wing pale, shining whitish gray.

Male genitalia as figured (Plate VI, figs. 1 & 1a). They differ from all other species of *Procus* known to me by the absence of the corona on the cucullus of the valve. They are immediately distinguished from *semicana* by the enlarged costal hump on the valve about two-thirds the way from base, by the shape of the cucullus, and by the absence of the corona.

Female genitalia as figured (Plate VI, fig. 2). They can be readily distinguished from *semicana* by the heavily chitinized and medially ridged eighth sternite, a character that can be easily seen by brushing the scales off the end of the abdomen on the ventral side.

Type: Male, New Brighton, Pennsylvania, June 15, 1902 (H. D. Merrick). U. S. N. M. Type No. 60131.

Paratypes: 1 male, Conistee Falls, Brevard, North Carolina, June 24, 1941 (R. L. Chermock), in Franclemont Collection; 1 female, Allegany State Park, New York, June 30, 1941 (A. R. Shadle), in the United States National Museum Collection; 1 female, Conistee Falls, Brevard, North Carolina, June 24, 1941 (R. L. Chermock), in Franclemont Collection.

#### *Meropleon* Dyar, 1924.

A study of the male and female genitalia of the two species, *diversicolor* Morrison and *ambifusca* Newman, at present placed in *Oligia*, has shown that these species are congeneric with *Meropleon cosmion* Dyar, and both should be removed to that genus.

The genus, as placed by McDunnough in his Check list, is far removed from its associates; it should be placed as an intermediate between *Procus* (*Oligia*) and its allies and *Archanara* Walker (*Nonagria*). The female genitalia of the three species, *cosmion*, *diversicolor* and *ambifusca*, are almost identical in structure with those of the species of *Archanara*, whereas the male genitalia are considerably more simplified than those of the species of that genus,

and recall, in essentials, those of the genus *Bellura* (*Arzama* or *Sphida*).

*Apamea* Ochsenheimer, 1816.

The first valid designation of a type for *Apamea* Ochsenheimer (Schmetterlinge von Europa, vol. 4, p. 75, 1816) was made by Samouelle in 1819 (Entomologists' Useful Compendium, p. 251), when he selected *Noctua basilinea* Schiffermüller, 1775, as the type. It has recently been shown that *Noctua basilinea* Schiffermüller is a synonym of *Phalaena sordens* Hufnagel, 1766. Since Samouelle's type designation antedates Curtis' designation of *Noctua chryso-grapha* Schiffermüller, 1775 = *Phalaena Noctua nictitans* Linnaeus, 1767 = *Phalaena Noctua oculea* Linnaeus, 1761<sup>1</sup> (British Entomology, vol. 6, p. 260, 1829), *Apamea* will supplant *Septis* Hübner, [1821], in American lists.

However, there has been some debate over the Samouelle "type designations" in the Lepidoptera; the following three points have been raised by those who oppose them: First, it is said that he was dealing with only British insects; this is baseless as long as the species designated as type was originally included in the genus by its author. The second challenges Samouelle's statement ". . . which may be considered as types . . ." as being ambiguous and suggesting the possibility of a future change. The third calls attention to the fact that of the thirty so-called type designations only eleven are valid because more than one species is cited under the other nineteen names. This last fact places the designations in much the same light as those of Latreille in 1810 (Considérations Générales sur l'Ordre Naturel des Crustacés, Arachnides et Insectes). For the present I am accepting, as was done by Tams (Entomologist, vol. 72, pp. 66-74 and 133-141, 1939), the eleven instances in which a single species was mentioned as being a valid type designation.

*Apamea amputatrix* (Fitch).

*Hadena amica*? Stephens, Illustrations of British Entomology, Haustellata, vol. 2, p. 180, pl. 23, fig. 2, 1829, *nec* Treitschke, 1825.

*Hadena arctica* Boisduval, Genera et Index Methodicus Europæ-

---

<sup>1</sup> *Phalaena Noctua nictitans* Linnaeus, 1767, is a substitute name for *Phalaena Noctua oculea* Linnaeus, 1761. The only reference cited under *nictitans* is "Fn. Svec. 1215.\*," which is *oculea* in the Fauna Suecica, 2nd Edition.



orum Lepidopterorum, p. 120, 1840 (*nomen nudum*<sup>2</sup>).

*Hadena arctica* Freyer, Neuere Beiträge zur Schmetterlingskunde, vol. 5, p. 19, pl. 394, fig. 1, 1842, *nec Hadena arctica* Zetterstedt, 1839. (See Opinion 134 of the International Commission on Zoological Nomenclature for the method to be applied in interpreting Freyer's system.)

*Hadena amputatrix* Fitch, Trans. New York State Agr. Soc., vol. 16, p. 425, 1856 (Third Report of the Noxious and Other Insects

# EXPLANATION OF TEXT FIGURES.

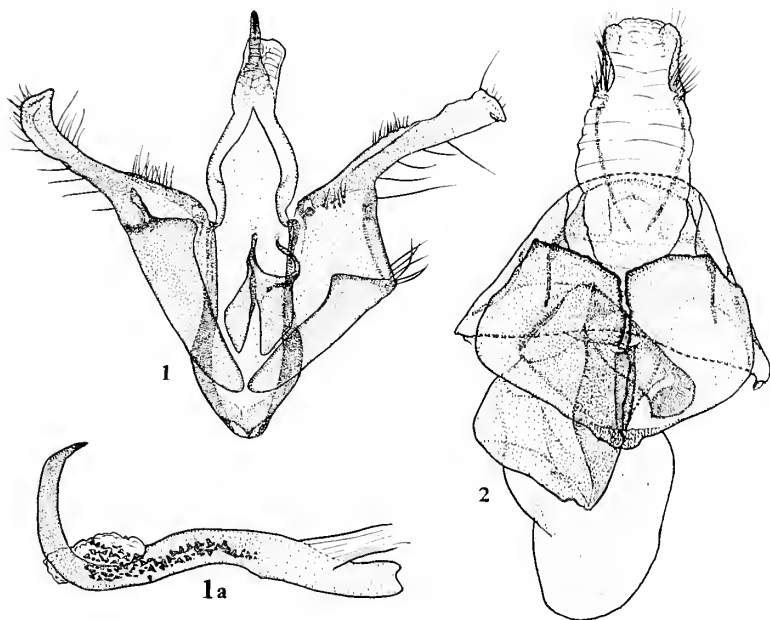


FIG. 1. Male genitalia of *Zalc phaeocapna* (Type), aedeagus removed.

1a. Aedeagus of *Zalc phaeocapna* (Type).

2. Female genitalia of *Zalc phaeocapna* (New Brighton, Pennsylvania).

<sup>2</sup> The Boisduval specimen associated with this name passed to the Oberthur, thence to the Barnes, and finally to the United States National Museum Collection. It is the species now going under that name in *Septis*, and not *Hadena arctica* Zetterstedt, 1839 (*Insecta Lapponica Descripta*, p. 939), which is at present in the genus *Anomogyna* Staudinger, 1871.

of New York, p. 425, or in the separate the page is 107).

The name *arctica* must be dropped from use in this genus as it is an original homonym, and in its place the name *amputatrix* should be used.

*Amphipoea* Billberg, 1820.

For the species now standing in *Apamea*, *Amphipoea* Billberg may be used. This name was proposed (Enumeratio Insectorum in Museo Gust. Joh. Billberg, p. 87, 1820) for the following species: *nictitans* Linn., *2 pustulata* [no author], *didyma* Brkh., *oculea* Fabr., *basilinea* Fabr., and *graminis* Linn. Tams' designation of *Phalaena Noctua secalis* Linnaeus, 1758 (Entomologist, vol. 72, p. 136, 1939) as the type is invalid because *secalis* is not included. *Phalaena Noctua nictitans* Linnaeus, 1767 = *Phalaena Noctua oculea* Linnaeus, 1761 = *Amphipoea oculea* (Linnaeus) is here designated as the type.

*Zenobia* Oken, 1815.

*Zenobia* Oken (Okens Lehrbuch der Naturgeschichte, vol. 3 (1), p. 681, 1815) with three included species, *oo* Linnaeus, 1758, *delphini* Linnaeus, 1758, and *retusa* Linnaeus, 1761, and with type designated as *Phalaena Noctua retusa* Linnaeus, 1761, by Prout (Entomologist's Record, vol. 13, p. 184, 1901) is an earlier name for *Ipinorpha* Hübner (Verzeichniss bekannter Schmettlinge [sic!], p. 238, [1821]) with type *Noctua subttusa* Schiffermüller, 1775, designated by Grote (Bull. Buffalo Soc. Nat. Sci., vol. 2, p. 24, 1874). *Plastenis* Boisduval (Genera et Index Methodicus Europæorum Lepidopterorum, p. 93, 1840) with type *Noctua subttusa* Schiffermüller, 1775, designated by Hampson (Catalogue of the Lepidoptera Phalaenae in the British Museum, vol. 9, p. 147, 1910) is also a synonym. *Zenobia* has recently been used by European workers in place of *Ipinorpha*, and the same course of action should be taken by American workers.

CUCULLINAE

*Sunira* New Name.

For *Rusina* of our present list (McDunnough, Check List of the Lepidoptera of Canada and the United States, pt. 1, p. 86, 1938) a new name is needed. Through an oversight, which was based on an error of Hampson, we thought that the type of *Rusina* Stephens (Illustrations of British Entomology, Haustellata, vol. 2, p. 112, 1829) was *Noctua ferruginea* Schiffermüller, 1775 (= *Phalaena*

*circellaris* Hufnagel, 1766). However, upon checking Stephens' proposal of the genus, it was found that he included the species *Bombyx ferruginea* Esper, 1785 (= *Noctua umbratica* Goeze, 1781). The figure of the male of *Bombyx ferruginea* Esper (*Die Schmetterlinge*, vol 3, pl. 47, fig. 5) is readily recognized as the species included and described by Stephens, but the figure of the female (*loc. cit.*, fig. 6) is essentially unrecognizable, and apparently does not belong to the same species. The name *ferruginea* Esper is here restricted to the figure of the male, this being the common practice of European workers. The genus *Stygiostola* Hampson (*Catalogue of the Lepidoptera Phalaenae in the British Museum*, vol. 7, p. 44, 1908), with *Noctua umbratica* Goeze, 1781, designated as the type at the time of the description of the genus, is an isogenotypic synonym of *Rusina* Stephens.

The name *Sunira*, with type *Xanthia bicolorago* Guenée, 1852 = *Sunira bicolorago* (Guenée), is proposed for *Rusina* Hampson (*Catalogue of the Lepidoptera Phalaenae in the British Museum*, vol. 6, p. 470, 1906) and *Rusina* McDunnough (*Canadian Entomologist*, vol. 69, p. 46, 1937). The species included are those listed by McDunnough under *Rusina* in his Check List and the Eurasian species, *circellaris* Hüfnagel.

#### ACONTIINAE

##### *Unca* Oken, 1815.

*Unca* Oken (*Okens Lehrbuch der Naturgeschichte*, vol. 3 (1), p. 689, 1815) with three listed species, *triplesia* Linnaeus, 1758, *gamma* Linnaeus, 1758, and *ni* Clerck, 1759, and with the following species incidentally mentioned: *unca* Schiffermüller, 1775, *interrogationis* Linnaeus, 1758, *chrysitis* Linnaeus, 1758, *sulphurea* Schiffermüller, 1775, *glyphica* Linnaeus, 1758, and *lunaris* Schiffermüller, 1775; and with *Noctua unca* Schiffermüller, 1775 = *Phalaena Tortrix uncana* Linnaeus, 1761 = *Phalaena uncula* Clerck, 1759, type by tautonymy, is an earlier name for *Lithacodia* Hübner (*Zuträge zur Sammlung exotischer Schmettlinge [sic!]*, vol. 1, p. 18, 1818) with type *Lythacodia bellicula* Hübner, 1818, by monotypy. *Eustrotia* Hübner (*Verzeichniss bekannter Schmettlinge [sic!]*, p. 253, [1821]), with type *Noctua unca* Schiffermüller, 1775 = *Phalaena uncula* Clerck, 1759, by monotypy, is also a synonym. *Erastria* Ochseneheimer (*Schmetterlinge von Europa*, vol. 4, p. 92, 1816), with thirteen included species, and with *Noctua unca* Schiffermüller, 1755 = *Phalaena uncula* Clerck, 1759, designated by Curtis (*British Entomology*, vol. 3, p. 140,

1826), is likewise a synonym. In addition it should be pointed out that the commonly used name for this group, *Erastria* Ochsenheimer, is a homonym of *Erastria* Hübner (Sammlung exotischer Schmetterlinge, vol. 1, pl. [203], [1813]). *Erastria* was first used by Hübner in 1806 ("Tentamen") for a geometer, and the name was continued in that group by Hübner; Ochsenheimer took up the name, but he applied it to a genus of noctuids!

If *Unca* is used, it will take precedence over all other names proposed for this concept, and it will replace *Erastria* of the McDunnough Check List (part 1, p. 109).

#### CATOCALINAE

*Zale* Hübner, 1818.

#### *Zale phaeocapna* n. sp.

In the spring of 1943, a few specimens of an unfamiliar species of *Zale* were taken at bait in southeastern Alabama. At that time it was thought that they might be the "true *lunifera*" of Hübner. However when this possibility was checked in 1946, it was easily proved to be incorrect. The species could not be matched with any of the described ones, though it was superficially close to *lineosa* Walker (*lunifera* auct.)

This species resembles *lineosa* Walker very closely and will undoubtedly be found confused with that species in collections. However, it is slightly smaller and with very different male and female genitalia.

Forewing gray brown, the basal area dark brown; the t. a. line well defined; the median shade consisting of three irregular, waved, parallel lines; the t. p. line follows the same course as that in *lineosa*, angled out from costa to vein  $R_5$ , then with an inward curve to vein  $M_2$ , and then outcurved and more or less straight to inner margin; a vague dark line parallel to the t. p. line, strongly accented on the costa by an irregular black shade; terminal area rather uniform; reniform a laterally compressed oval, somewhat shaded with black, with a pale area on its outer side. Hind wing much like the forewing; the t. p. line continuous and with a finely waved, straight, black line parallel to it and followed by a bluish brown shade; terminal area as on forewing. Below both wings a rather uniform dusky, gray brown, with a faint discal spot on both wings; the outer line evenly curved and dark.

Male genitalia as figured (text figures 1 and 1a). They differ from all other North American species by the possession of a large number of short, stout cornuti on the vesica of the aedeagus.

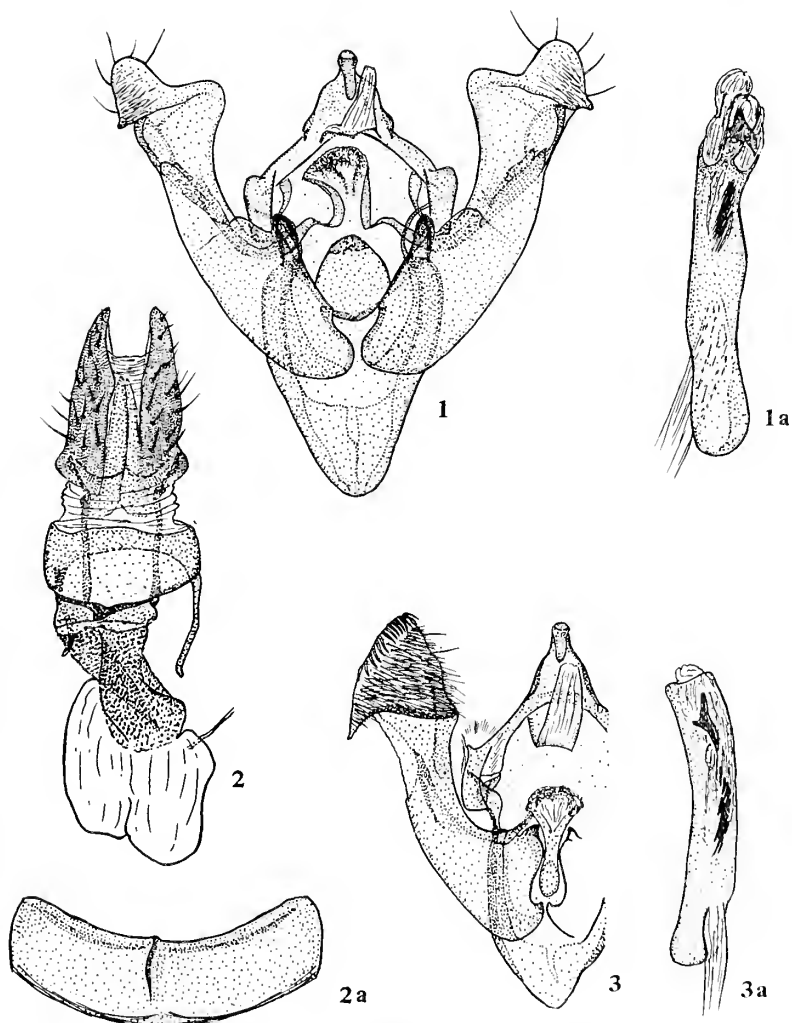


FIG. 1. Male genitalia of *Procnus crytora* (Type) aedeagus removed.

1a. Aedeagus of *Procnus crytora* (Type).

2. Female genitalia of *Procnus crytora* (Allegany State Park, New York).

2a. Eighth sternite of the female of *Procnus crytora*.

3. Male genitalia of *Procnus semicana* (Walker) (New Brighton, Pennsylvania). aedeagus removed.

3a. Aedeagus of *Procnus semicana* (Walker).

Female genitalia as figured (text figure 2). The ventral plates are almost symmetrical, but the opening to the ductus bursae is under the left plate.

Type: Male, New Brighton, Pennsylvania, May 10, 1903 (H. D. Merrick), U.S.N.M. Type No. 60132.

Paratypes: 6 males and 3 females, New Brighton, Pennsylvania, April 19–May 4 (H. D. Merrick), 4 Collection of the Academy of Natural Sciences of Philadelphia, 3 Collection of the United States National Museum, 2 Collection of the Carnegie Museum of Pittsburgh; 2 males, Oak Station, Pennsylvania, April 19 and May 1 (Fred Marloff), Collection of the Carnegie Museum of Pittsburgh; 1 male and 1 female, Pittsburgh, Pennsylvania, April 27 and May 14 (Henry Engel), Collection of the Carnegie Museum of Pittsburgh; 5 females, Shawville, Clearfield County, Pennsylvania, May 2–June 1 (John Bauer), Collection of the Carnegie Museum of Pittsburgh; 2 males and 4 females, Camp Rucker, Ozark [Daleville], Alabama, March 19–April 7, 1943 (J. G. Franclemont), Franclemont Collection; 1 male, no data, Collection of the Carnegie Museum of Pittsburgh.

I wish to thank Mr. James A. G. Rehn, of the Academy of Natural Sciences of Philadelphia, for the loan of four specimens of this species; they were the specimens which had been referred to *lunifera* by Hainbach (Trans. Amer. Ent. Soc., vol. 54, p. 226, 1928). I also wish to thank Dr. Walter R. Sweadner, of the Carnegie Museum of Pittsburgh, for the loan of the entire series of *lineosa* Walker (*lunifera* auct.), *penna* Morrison and *galbanata* Morrison, for it was in this material that an additional thirteen specimens of *phaeocapna* were found.

*Zale calycanthata* (Smith & Abbot).

*Phalaena calycanthata* Smith & Abbot, The Natural History of the Rarer Lepidopterous Insects of Georgia, vol. 2, p. 207, pl. 104, 1797.

*Phaeocyma calycanthi* Hübner, Beiträge zur Sammlung exotischer Schmetterlinge [*sic!*], vol. 1, p. 19, 1818. (Emendation of *calycanthata*).

The Abbot plate contains the representations of two species of this genus, *lunifera* Hübner at the top left of the plate and *calycanthata* of authors at the bottom right. In order to maintain the name *calycanthata* in its prevailing use, it is restricted at this time to the figure in the lower right of plate 104.

The range of this species is from New Jersey to Texas. The

Texas specimens included by Smith in his type series of *colorado* belong to this species.

The moth has been reared from larvae found on oak.

*Zale lunifera* (Hübner).

*Phalaena calycanthata* Smith & Abbot (in part), *The Natural History of the Rarer Lepidopterous Insects of Georgia*, vol. 2, p. 207, pl. 104, 1797.

*Phaeocyma lunifera* Hübner, *Zuträge zur Sammlung exotischer Schmettlinge [sic!]*, vol. 1, p. 19, figs. 97 and 98, 1818.

Type locality: "Georgien in Florida."

Location of type: Unknown.

*Homotera cingulifera* Walker, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, part 13, p. 1056, 1857.

Type locality: "East Florida."

Location of Type: British Museum (Natural History).

*Homoptera intenta* Walker, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, part 13, p. 1070, 1857.

Type locality: "—————?" [The specimen now has associated with it a label bearing the following data, "St. Vincent/39. 7. 17, / 64."]

Location of type: British Museum (Natural History).

*Homoptera woodii* Grote, *Canadian Entomologist*, vol. 9, p. 89, 1877.

Type locality: "Centre, New York."

Location of type: British Museum (Natural History).

It is very difficult to understand how anyone could have confused this species with *lineosa* Walker, because Hübner's figures are excellent representations of the species now standing as *cingulifera* Walker in most collections. The error must have arisen either by an inability or a failure to consult the original of the "Zuträge." The so-called "Facsimile Edition" of the "Zuträge" by Wytsman and Kirby has a very poor copy of the Hübner figures, but nevertheless they are more like the species discussed here than *lineosa*.

The larvae of this moth have been raised on black cherry (*Prunus serotina*).

*Zale lineosa* (Walker).

*Homoptera lineosa* Walker, *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum*, part 13, p. 1056, 1857.

Type locality: "United States."

Location of type: British Museum (Natural History).

*Homoptera galbanata* Morrison, Proc. Acad. Nat. Sci. Philadelphia, [vol. 27], p. 435, 1875 [1876]. (New synonymy.)

Type locality: "Glencoe, Nebraska."

Location of type: Unknown.

*Homoptera penna* Morrison, Proc. Boston Soc. Nat. Hist., vol. 18, p. 24, 1876. (New synonymy.)

Type locality: "Galena, Illinois."

Location of type: Unknown.

This is the species which is standing in almost all collections under the name of *lunifera* Hübner, but, as pointed out above, this is not at all compatible with Hübner's figures of that species. Grote seems to have originated this misidentification, and occasional efforts to dispute it have generally been ignored. I cannot guess why Grote thought this species was the one figured by Hübner, because I know that Grote had available only the original edition of Hübner's "Zuträge."

Morrison's two names, *galbanata* and *penna*, are referable to this extremely variable species. The descriptions are good, and that of *galbanata* is close to typical *lineosa*, whereas that of *penna* is of the form with the conspicuous black band on the inner side of the t. p. line. I have examined specimens identified as *penna* and *galbanata* from the type localities, and find the genitalia to be the same as those of *lineosa*. I do not believe that the names can be accorded racial status, and I would not use them to designate forms.

*Caenurgia* Walker, 1858.

**Caenurgia chloropha** (Hübner), New Combination.

*Gloe chloropha* Hübner, Erste Zuträge zur Sammlung exotischer Schmetterlinge, p. 5, 1808. (*Nomen nudum*.)

*Xestia chloropha* Hübner, Zuträge zur Sammlung exotischer Schmettlinge [*sic!*], vol. 1, p. 16, figs. 73 & 74, 1818.

Type locality: "Georgien in Florida."

Location of type: Unknown.

*Drasteria convalescens* Guenée, Histoire Naturelle des Insectes, Species Général des Lépidoptères, vol. 7. p. 289, (Noctuelles), pl. 22, fig. 9, 1852. (New synonymy.)

Type locality: "Amérique Septentrionale."

Location of type: United States National Museum.

*Caenurgia socors* Walker, List of the Specimens of Lepidopterous Insects in the Collection of the British Museum, part 14, p. 1492, 1858.



Type locality: "East Florida and New York."

Location of type: British Museum (Natural History).

*Caenurgia purgata* Walker, List of the Specimens of Lepidopterous Insects in the Collection of the British Museum, part 14, p. 1492, 1858.

Type locality: "East Florida."

Location of type: British Museum (Natural History).

Dr. W. T. M. Forbes has recently demonstrated to me that Hübner's figures of *chloropha* are excellent representations of a somewhat dark female of the species now standing in collections under the name of *convalescens*. The figures do not in the least resemble *Heliothis lupatus* Grote, with which Barnes and McDunnough identified it in their 1917 Check List (page 38). Thus *chloropha* should be transferred to *Caenurgia* and used in place of *convalescens*, and *lupatus* should be used for the species of *Heliothis* at present referred to under the name of *chloropha*.

---

**A Curious Habit of an Empidid Fly; Third Note.** The previous notes on the mating behavior of *Rhamphomyia longicauda* Loew were published in this Bulletin, Vol. XXXVI, p. 117 (1941), and Vol. XXXVII, p. 67 (1942), under the name *Rhamphomyia fumosa* Loew. Curtis W. Sabrosky has kindly furnished me with the correct name after examination of the Loew types. We have found the fly to be abundant in southern Michigan from the end of May to the middle of July.

I have seen many of the flies on Grosse Ile during the last few years, but this year they are more abundant than ever and on June 27 I saw a large swarm flying about in a small area on the west side of my tool-shed a foot or two above the ground. The swarm seemed to consist largely of males, although the females were also abundant enough. One sweep of the net yielded nine males, one female, six caddis flies (*Oecetis inconspicua* Wlk.), and three gnats (two *Pentaneura monilis* L. and one *Procladius culiciformis* L.). Most of the males seemed to be carrying a caddis fly and the mating pairs flying in circles at a somewhat higher elevation also had a caddis fly. A couple more sweeps with the net captured 16 male *Rhamphomyia* (plus a few that escaped), 4 females, and 17 *Oecetis*.—  
GEORGE C. STEYSKAL, Grosse Ile, Michigan.

NEW OR INSUFFICIENTLY-KNOWN CRANE-FLIES  
FROM THE NEARCTIC REGION  
(DIPTERA, TIPULIDAE)  
PART XIII<sup>1</sup>

By C. P. ALEXANDER, Amherst, Mass.

The preceding part under this general title was published in April, 1950 (Bull. Brooklyn Ent. Soc., 45: 41-47). In this part a slight typographical error appeared when the galley proof was transferred to page proof. The last three lines on page 44 should appear under the genus *Dactylolabis* on the succeeding page. The flies herewith discussed are from Oregon, California and Arizona, as discussed under the individual species. Except where noted to the contrary, the types are preserved in my collection.

*Tipula* (*Lunatipula*) *dido malheurensis* n. subsp.

Close to the typical form (Barton Flats, San Bernardino Mountains, California, altitude 6,300 feet, July 16, 1946, collected by Alexander and Sperry), differing in slight details of coloration.

Costal border of wing and a conspicuous seam over veins *Cu* and *m-cu* brown; cell *M*, posterior border of *R*, and bases of Anal cells paler than the wing tip or the posterior border; obliterative band at cord wider and more conspicuous against its blackened ground than is the case in the typical form.

In both races, the male hypopygium shows the phallosome with three pairs of plates; upper plate broad, at apex extended into a point; longest plate bearing a sharp spine on its upper margin, thence united to form a single prow-shaped structure, the lower edge with a small erect spine. Lower pair of plates long and slender, unequally forked at apex, the terminal spine longer and more slender; base of plate extended into a lobe. In *malheurensis*, the central prow-shaped structure is more slender, with the various spines and points weaker. Lower plate slender, not produced into a conspicuous lobe at base, the two outer spines more nearly equal in size.

*Habitat*: Oregon (Grant County).

*Holotype*: ♂, Beech Creek Forest Camp, Malheur National Forest, altitude 4,500 feet, August 16, 1948 (C. P. Alexander). Allotopotype, a broken ♀, with the type.

---

<sup>1</sup> Contribution from the Department of Entomology, University of Massachusetts.

**Erioptera (Empeda) gloydae n. sp.**

Mesonotum reddish, sparsely pruinose, more heavily so on the sides; wings grayish yellow, the costal field clearer yellow; male hypopygium with the outer dististyle profoundly bifid, the outer arm a narrow simple blade, the inner arm a little shorter, unequally split at tip, the upper point narrower and more acute than the lower one; inner dististyle a simple parallel-sided blade, the tip obtuse.

*Female*: Length about 3.5 mm.; wing 3.7 mm.

Rostrum brownish yellow; palpi light brown. Antennae dark brown, the enlarged scape and pedicel somewhat paler. Head clear light gray.

Pronotum and pretergites yellow, clearest laterally. Mesonotal praescutum and scutum reddish with a gray pruinosity, heavier on the sides; scutellum gray at base, the posterior border broadly reddish; mediotergite with central portion weakly darkened, the sides more reddened. Pleura reddish yellow, sparsely pruinose. Halteres obscure yellow. Legs obscure yellow, the outer tarsal segments more darkened. Wings grayish yellow, the prearcular and costal fields clearer yellow; veins yellowish brown, clearer yellow in the brightened fields. Venation:  $Sc_1$  ending just beyond one-third the length of  $Rs$ ,  $Sc_2$  some distance from its tip; vein  $R_3$  relatively long, nearly equal to  $R_{2+3+4}$  and  $R_{3+4}$  combined; cell  $M_2$  open;  $m-cu$  close to fork of  $M$ .

Abdomen reddish brown. Ovipositor with the cerci horn-yellow. Male hypopygium with the outer dististyle profoundly bifid, the outer arm a narrow simple blade, the inner arm a little shorter, unequally split at tip, the upper point narrower and more acute than the lower one. Inner dististyle a simple parallel-sided blade, its tip obtuse.

*Habitat*: Arizona (Cochise County).

*Holotype*: a fragmentary ♂, without wings, Ramsey Canyon, Huachuca Mountains, July 11, 1931 (L. K. Gloyd); Zoological Museum, University of Michigan. *Allotopotype*: ♀, with the type.

This interesting species is named for Mrs. L. K. Gloyd, student of the Odonata, who collected several interesting Tipulidae in the southwestern states in 1931. Although the type male is a mere fragment, it is certainly conspecific with the better preserved female and shows the hypopygial characters that separate it from all other regional species, including *Erioptera (Empeda) cinereipleura* Alexander and *E. (E.) perflavens* Alexander.

**Tasiocera (Dasymolophilus) miseranda** n. sp.

Size small (wing, male, about 3 mm.) ; general coloration of body brownish black; wings with sparse macrotrichia in outer ends of distal radial cells; male hypopygium with the dististyle very slender, especially the spinous outer half, the surface of style virtually smooth; phallosomic structure very short and compact, with relatively few spinous points.

*Male*: Length about 2.5–2.6 mm.; wing 3–3.2 mm.

Rostrum and palpi brown. Antennae black throughout. Head brownish black.

Thorax uniformly brownish black, the surface vaguely pruinose. Legs with the coxae and trochanters dark brown; remainder of legs obscure brownish yellow. Wings with a strong dusky tinge, uniform from base to apex; veins darker brown. Rows of macrotrichia in distal ends of the outer radial cells, especially  $R_2$  and  $R_3$ . Venation:  $R_2$  and  $R_{2+3}$  in transverse alignment, subequal to  $R_{4+5}$ , the latter in alignment with  $R_4$ ; basal section of  $R_5$  and  $r-m$  in transverse alignment, both lying distad of the level of  $R_{2+3}$ ; base of vein  $M_{1+2}$  atrophied, lying in the pale obliterative streak in cell  $M$ ; cell  $Cu$  slightly narrowed just before its outer end; vein 2nd  $A$  short, the cell narrow.

Abdomen brownish black. Male hypopygium with the dististyle terminal in position, very slender, especially the spinous outer half; surface of style nearly smooth or with very vague indications of a few scattered tubercles on outer margin of distal half. Phallosomic structure very short and compact, with relatively few spinous points. Aedeagus relatively stout, the acute apex blackened.

*Habitat*: Western Oregon.

*Holotype*: ♂, High Heaven, Yamhill County, May 4, 1947 (Kenneth M. Fender). *Paratypes*: ♂♂, Sourgrass Creek, Gunaldo Falls, Yamhill County, May 17, 1948 (Fender); Tierra del Mar, Tillamook County, May 13, 1949 (Fender).

The most similar described species is *Tasiocera (Dasymolophilus) subnuda* (Alexander), of California, which differs particularly in the structure of the male hypopygium, including the dististyle, phallosomic structure and aedeagus. Both species are figured in the Tipuloidea of Oregon, which should appear in press in the American Midland Naturalist in due course. The present fly is only one of the noteworthy Tipulidae discovered in Oregon by Kenneth Mark Fender, to whom our knowledge of the Oregon species is chiefly due.

**Cryptolabis (Cryptolabis) brachyphallus n. sp.**

Mesonotum brown, the lateral borders narrowly pale yellow; pleura dark brown, striped longitudinally with yellow; femora and tibiae yellow, the tips narrowly infuscated; wings whitish subhyaline, unpatterned; male hypopygium with the dististyle relatively stout, unequally bidentate at apex, the axial arm stoutest, terminating in a short point; aedeagus relatively short and stout.

*Male*: Length about 3.5 mm.; wing 4 mm.

*Female*: Length about 3.5 mm.; wing 4 mm.

Rostrum obscure yellow; palpi brown. Antennae black throughout; flagellar segments oval, shorter than the verticils. Head light fulvous.

Pronotum and pretergites pale yellow. Mesonotum chiefly light to darker brown, the lateral borders narrowly pale yellow, the latter including a continuous dorsal stripe passing through the wing root. Pleura dark brown, with a paler longitudinal stripe. Halteres pale. Legs with the coxae and trochanters yellow; femora and tibiae yellow, the tips narrowly infuscated; tarsi dark brown to brownish black. Wings whitish subhyaline, unpatterned; veins dark brown. Macrotrichia relatively sparse, restricted to the distal half or less of the outer wing cells. Venation: *Rs* relatively short, sinuous; *R*<sub>2</sub> more or less angulated or sinuous at near midlength; *m-cu* on *M*<sub>4</sub> some distance beyond the origin of the latter.

Abdomen dark brown. Male hypopygium with the dististyle relatively stout, unequally bidentate at tip, the outer or axial arm stoutest, not produced, terminating in a short point; second arm a relatively slender spine; outer half of style with relatively few scattered setae. Aedeagus short and stout, more or less constricted at near midlength, the surface appearing corrugated by transverse rows of microscopic spinulae.

*Habitat*: California (San Diego County).

*Holotype*: ♂, Tub Canyon, Borego, March 1, 1947 (John L. Sperry). *Allotopotype*: ♀ (Noël Crickmer). *Paratopotype*: 1 ♀, pinned with type.

Among the regional species having the male hypopygium most like that of the present fly are *Cryptolabis (Cryptolabis) mixta* Alexander and *C. (C.) sica* Alexander, both of which differ in all details of structure, particularly of the dististyle.

**Cryptolabis (Cryptolabis) retrorsa n. sp.**

*Male*: Length about 3–3.5 mm.; wing 3.8–4.2 mm.

*Female*: Length about 3–3.5 mm.; wing 3.5–3.8 mm.

Generally similar to *bisinuata*, differing especially in the structure of the male hypopygium.

Wings whitish subhyaline, paler at base; cord and vein *Cu* vaguely seamed with slightly darker, this color including the veins; remaining veins brown, those of the prearcular field pale. Macrotrichia of cells of male relatively sparse, restricted to the cells beyond the cord, more numerous in the outer ends of cells; in female, the trichia still more restricted. Venation: *Rs* steep, sinuous; *m-cu* on  $M_{3+4}$  a short distance before the fork.

Male hypopygium with the inner lobe of the basistyle unusually small and slender, with relatively few setae, there being only about five or six at apex; some setae of main body of style near apex very long. Dististyle elongate, simple, terminating in a small blackened point, near outer margin back from the apex with two unusually long setae, these directed backward, on mid-third of style with other normal erect setae. Aedeagus relatively stout but long, transversely corrugated, gradually narrowed outwardly.

*Habitat*: California, Oregon.

*Holotype*: ♂, Crescent City, Del Norte County, California, August 5, 1940 (H. and M. Townes). *Allotopotype*: ♀. *Paratypes*: Numerous specimens of both sexes, Siskiyou Mountains, Josephine County, Oregon; swept from low shrubs along the Illinois River at Store Gulch Camp, Siskiyou National Forest, 950 feet, August 9, 1948 (Alexander and Fender).

Readily told from other regional species, including *Cryptolabis* (*Cryptolabis*) *bisinuata* Doane, by the structure of the male hypopygium, as described.

## CONTENTS

(Arranged alphabetically throughout)

### COLEOPTERA

- |  |   |
|--|---|
| <p>An Annotated List of Utah Cerambycidae, G. F. Knowlton and S. L. Wood, 10</p> | <p>Hippodamia convergens, D. L. Wray, 116<br/>Some Western Tortoise Beetles, G. F. Knowlton, 49</p> |
|--|---|

### COLLEMBOLA

- |  |   |
|--|---|
| <p>A Preliminary List of Collembola of Utah, D. L. Wray, G. F. Knowlton and S. C. Ma, 60<br/>Collembola in Northern Utah Celery Fields, G. F. Knowl-</p> | <p>ton, S. C. Ma and D. L. Wray, 96<br/>Some New Collembola from Utah and Idaho, D. L. Wray, 91</p> |
|--|---|

### DIPTERA

- |   |  |
|---|--|
| <p>A Curious Habit of an Empidid Fly; Third Note, George S. Steyskal, 155<br/>A Nemestrinid Bred from a Grasshopper in the United States, J. Bequaert, 104<br/>A New Species of Pseudogaurax from Florida (Chloropidae), Curtis W. Sabrosky, 33<br/>Nemestrinidae in Wyoming, J. Bequaert, 64<br/>New or Insufficiently-Known Crane-Flies from the Nearctic Region (Tipulidae) Part XII, C. P. Alexander, 41<br/>New or Insufficiently-Known Crane-Flies from the Nearctic Region (Tipulidae) Part XIII, C. P. Alexander, 156<br/>New Records of North American Nemestrinidae; with De-</p> | <p>scription of a new Hirmoneura from Mexico, Joseph C. Bequaert, 8<br/>New Species of New World Volucella, F. M. Hull, 65<br/>Sciar (Neosciara) Beebei, a new Species of Sciaridae having Migratory Larvae. F. R. Shaw and M. M. Shaw, 14<br/>The Genus Paraprosalpia (Vileneuve) in North America. (Prosalpia Pokorný Preoc.), H. C. Hockett, 121<br/>The Microtrichiae of Anopheles Albimanus Wiedemann, G. S. Tulloch and J. E. Shapiro, 48<br/>The Microtrichiae of Uranotaenia, G. S. Tulloch and J. E. Shapiro, 72<br/>Wohlfahrtia Less Troublesome, G. F. Knowlton, 13</p> |
|---|--|

## GENERAL SUBJECT

- |  |  |
|--|--|
| Alan Sloan Nicolay, George S. Tulloch, 82            | American Spiders, Leonard G. Worley, 29                        |
| Book Notes (on order of appearance)                  | The Insect World of J. Henri Fabre, C. J. Zymaris, 31          |
| Principles of Insect Pathology, George S. Tulloch, 7 | Glycogen Metabolism in Insects: A Review, Morris Rockstein, 74 |

## HETEROPTERA

- |  |  |
|--|--|
| Bilateral Abnormality of the Antennae in <i>Ptochiomera nodosa</i> (Lygaeidae), Roland F. Hussey, 27 | Notes Concerning <i>Nabis</i> Feeding, G. F. Knowlton, 28  |
| Concerning North American Saldidae, Carl J. Drake, 1   | The Genera <i>Baldulus</i> and <i>Dalbulus</i> in North America including Mexico (Cicadellidae), Dwight M. DeLong, 105 |

## HOMOPTERA

- |  |   |
|--|---|
| <i>Calaphis coloradensis</i> Granov., G. F. Knowlton, 86 | <i>Periphyllus</i> Aphid Notes, G. F. Knowlton, 118 |
| <i>Neosymdobius</i> aphids, G. F. Knowlton, 71           | Two Aphid Records, G. F. Knowlton, 89               |

## HYMENOPTERA

- |   |   |
|---|---|
| A New Species and a new variety in the Genus <i>Priochilus</i> Banks (Psamocharidae) With a Key to the Species of North America and the Antilles, R. R. Dreisbach, 50 | (Vespidae), Richard M. Bohart, 17   |
| A New Species of the Genus <i>Psorthaspis</i> (Psamocharidae) from Arizona, R. R. Dreisbach, 119  | Notes on the Food Habits of <i>Strumigenys Louisianae</i> Roger (Formicidae), Edward O. Wilson, Jr., 85 |
| A Synopsis of <i>Maricopodynerus</i>  | Supplementary Notes on the Feeding of Dacetine Ants, William L. Brown, Jr., 87                          |
|   | Synonymical Notes on North American Sphecoid Wasp: III, Karl V. Krombein, 35                            |



LEPIDOPTERA

- |   |   |
|---|---|
| A New <i>Grotella</i> from Southwest Texas ( <i>Phalaenidae</i> ), Rowland R. McElvare, 117 | John G. Franclemont, 144  |
| A New <i>Heliothid</i> from New Mexico, Rowland R. McElvare, 83                             | On the Identity of <i>Therina Fervidaria</i> Hubner ( <i>Geometridae</i> ), John G. Franclemont, 90 |
| Notes on Some Genera and Species of Eastern Moths with Descriptions of New Species,         | Two Unrecorded Homonyms in the Genus <i>Euxoa</i> ( <i>Phalaeninae</i> ), James H. McDunnough, 84   |

OTHER ORDERS AND OTHER ANIMALS

- |  |  |
|--|--|
| Abnormality in <i>Corydalus</i> ( <i>Megaloptera</i> ), George S. Tulloch, 116 | Additional Locality Record, Richard B. Eads and George C. Menzies, 26        |
| Prevalence of <i>Amblyomma Cajennense</i> in Texas with an                     | Records and Descriptions of Nearctic Caddis Flies, Part 1, D. G. Denning, 97 |

## INDEX TO VOLUME XLV

Arranged alphabetically throughout; valid species in Roman type, new forms **boldface**.  $\phi$  indicates other animals; \* plants. Not included in this index; extensive lists of insects on pages 10-13, 60-64, 96, 118.

Number of New Genera and Subgenera in this index, 2.

Number of New Species and other forms in this index, 44.

- Achorutes **promatro**, 94  
 Aedes dorsalis, 28  
     aegypti, 73  
 $\phi$  Amblyomma americanum, 26  
     cajennense, 26  
 Anopheles albimanus, 48, 73  
     quadrinaculatus, 48, 73  
 Apamea amputatrix, 146  
 Arctopsyche californica, 97  
     inermis, 98  
 Baldulus **bilineatus**, 108  
     montanus, 107  
     **tropicus**, 109  
 \*Betula fontinalis, 71  
 Caenurgia chloropha, 154  
 Calaphis coloradensis, 86  
 Calliphora erythrocephala, 74  
     vomitoria, 77  
 Capitophorus elongatus, 28  
     fragaefolii, 28  
 Chimarra **beameri**, 101  
     moselyi, 102  
     **primula**, 100  
 \*Chrysothamnus nauseosus, 28  
 Corydalus cornutus, 116  
 Cryptolabis **brachyphallus**, 159  
     **retorsa**, 159  
 Culex pipiens, 73  
 Dactylolabis (**Eudactylolabis**)  
     **vestigipennis**, 45  
 Dalbulus, 105  
     acus, 112  
     elimatus, 109  
     **gelbus**, 114  
     **guevarai**, 110  
     **longulus**, 111  
     maidis, 112  
 Dasypodaea **zuni**, 83  
 Deiliphila euphorbiae, 78  
 Deloyala guttata, 49  
 Deuterosminthurus **neopandus**,  
     95  
 Diodontus alienus, 38  
     atratus parenosas, 36  
     frontalis, 35  
     trisulcus, 37  
 Drosophila funebris, 77  
     melanogaster, 78  
     repleta, 77  
 Erioptera **gloydae**, 157  
 Euoxa incallida, 84  
     orbicularis, 84  
 Eurymus eurytheme, 28  
 Galleria mellonella, 76  
 Grotella **vauriae**, 117  
 Hippodamia convergens, 116  
 Hirmoneura bradleyi **novileo-**  
     **nis**, 8  
     brevirostris, 8  
     texana, 8  
 Hypoderma lineatum, 74  
 Jonthonota nigripes, 49

- Lepidocyrtus cuaneus*, 86  
*Locusta migratoria*, 79  
*Lucilia sericata*, 77  
*Malacosoma americana*, 76  
*Maricopodynerus chisosensis*, 20  
     *decorabilis*, 22  
     *lissus*, 23  
     *rudiceps*, 21  
     *sericifrons*, 19  
     *shannoni*, 21  
*Melanoplus differentialis*, 77  
     *m. mexicanus*, 104  
*Metator pardalinus*, 104  
*Metriona bicolor*, 49  
     *purpurata*, 49  
*Nabis alternatus*, 28  
     *ferus*, 28  
*Neanura muscorum*, 86  
*Neorhynchocephalus sackenii*, 9,  
     64, 104  
     *volticus*, 9  
*Neosymodobius albasiphus*, 71  
     *annulata*, 71  
     *internedius*, 71  
*Nyctiophylax zelenus*, 99  
     *vestitus*, 99  
  
*Oecetis inconspicua*, 155  
*Onychiurus armatus*, 88  
     *magninus*, 91  
     *mai*, 99  
*Panaphis juglandis*, 89  
*Paraprosalpia angustitarsis*, 129  
     *arelate*, 130  
     *brevitarsis*, 131  
     *conifrons*, 131  
     *constrictor*, 132  
     *denticauda*, 133  
     *genalis*, 140  
     *gentilis*, 142  
     *incisa*, 134  
     *littoralis*, 134  
     *longipennis*, 135  
     *moerens*, 136  
     *pilitarsis*, 136  
     *sepiella*, 137  
     *silvestris*, 137  
*Pentaneura monilis*, 155  
*Periplaneta orientalis*, 77  
*Phormia regina*, 78  
*Plagiometriona clavata diversicollis*, 49  
*Polycentropus gertschi*, 100  
*Priochilus admirationis*, 55  
     *amabilis*, 55  
     *formosus hondurensis*, 51  
     *gloriosus*, 56  
     *hinei*, 53  
     *nobilis*, 56  
     *opacifrons*, 57  
     *regius*, 57  
     *rhomboideus*, 58  
     *sericeifrons*, 58  
*Procladius culiciformis*, 155  
*Procus crytora*, 144  
*Prodenia eridania*, 74, 75  
*\*Prunus serotina*, 153  
*Pseudogaurax anchora*, 33  
     *floridensis*, 33  
     *signatus*, 33  
*Psorthaspis arizonensis*, 119  
*Psyllus negundinis*, 28  
*Ptenothrix mamorata*, 86  
*Ptochiomera nodosa*, 27  
  
*\*Quercus gambelii*, 89  
     *stellata*, 71  
  
*Rhabdomastix nuttingi*, 46  
*Rhamphomyia longicauda*, 155  
  
*Saldula argentina*, 3  
     *balli*, 6

- explanata, 4  
hirsuta, 5  
    **pexa**, 5  
**notalis**, 4  
opacula, 2  
pallipes, 3  
**teretis**, 1  
xanthochila, 2  
limbosa, 3  
Salina decorata, 86  
Sciara **beebei**, 14  
Smithistruma rostrata, 88  
Strumigenys elongata, 87  
    louisianae, 85, 87  
  
Tasiocera **miseranda**, 158  
Tenebrio molitor, 78  
Tipula **catalinensis**, 41  
    dido **malheurensis**, 156  
  
Number of New Genera and Subgenera in this Index, 2.  
Number of New Species and other forms in this Index, 49.  
  
    **werner**i, 43  
Trichopsidea clausa, 9, 64, 104  
  
Uranotaenia sapphirina, 72  
  
Vacuna californica, 89  
Volucella **astarte**, 70  
    **lucilia**, 65  
    **pertinax**, 67  
    **ulrica**, 68  
  
Willemia **vashtia**, 92  
Wohlfahrtia opaca, 13  
Wormaldia thyria, 98  
Wyeomyia smithi, 73  
  
Zale calycanthata, 152  
    lineosa, 153  
    lunifera, 153  
    **phaeocapna**, 150





JMBB  
1954

Bulletin of the  
Vol. 122  
JUL 23 1954

9870  
BULLING  
JUL 23 1954  
JUL 23 1954

AMNH LIBRARY



100071729